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THE QUESTIONS SETTLED BY THE AWARD OF THE ALASKAN BOUNDARY TRIBUNAL.

AN ADDRESS BEFORE THE AMERICAN GEOGRAPHICAL SOCIETY, JANUARY 19, 1904,

BY

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(Map, page 128.)

It is my purpose this evening to give a general outline of the origin, course, and termination of the Alaskan Boundary Controversy. Undoubtedly, in attempting so comprehensive a treatment, I shall have to pass over ground more or less familiar to many of you; but I shall do so as briefly as possible, touching only upon the salient features—those actually necessary to explain the meaning and purpose of the questions submitted to the Tribunal which met at London last September.

It will be of material aid to a better understanding of the subject if you will bear in mind two facts, which will appear more clearly as we proceed. First, the *real* question at issue between the United States and Great Britain was, whether or not Canada should obtain a seaport on the Pacific Coast in the region which has been known as Southeast Alaska. And second, the questions submitted to the Tribunal were of greater or less importance as they affected this underlying issue.

It was on the 30th day of March, 1867, at four o'clock in the morning, that Secretary Seward and the Russian Minister at Washington signed the convention which ceded Russian America to the United States. The evening before the Czar's representative had received a cablegram from his Government authorizing him to accept the seven million two hundred thousand dollars offered by Secretary Seward for the territory. Without delay the treaty was drafted and before dawn was formally signed.

Under the guidance of Senator Sumner, who had been informed of the proposed purchase shortly after the arrival of the message from St. Petersburg, and who had promised the Secretary of State and the Russian Minister to support the measure in the Senate, the treaty received, on May 28th, the almost unanimous approval of that body. On June 20th the ratifications were exchanged at Washington, and the same day the treaty, by Presidential proclamation, became the law of the land. Thus the United States secured its title deed to the Russian possessions in America, thenceforth to be known as the Territory of Alaska.

This vast acquisition to our national domain embraces over 575,000 square miles and has a coast line exceeding that of the Atlantic States. Its eastern boundary may be conveniently divided into two sections. That to the north of Mount St. Elias follows the 141st meridian of west longitude to the Arctic Ocean. Its location upon the ground at certain points has been determined by astronomical observations. The section southeast of St. Elias extends in a winding course, at a short distance inland from the coast, as far south as the Portland Canal, which it follows to the ocean, and thence runs westerly to the southern point of Prince of Wales Island in latitude 54° 40′. It is the location of this latter portion of the boundary which has been in dispute between the United States and Great Britain.

The narrow coastal strip between this boundary and the sea is known commonly by its treaty name, as the "*Lisière*"; that is, the *border* or *selvage* of the continent. It is, approximately, 650 miles long, and has generally been drawn with a uniform width of 30 marine miles, measuring inland from tidewater. The portion east and south of Cross Sound is faced by an extensive archipelago, the islands forming it being separated by innumerable narrow straits and channels. The coast of the *lisière* is indented with many deep and winding fiords, known locally as "canals," from whose high and precipitous shores numerous glaciers flow down toward the sea.

Inland the *lisière* is a great mountain mass gashed with deep ravines and gorges, forming hundreds of short ridges, which have no common trend, but intersect each other in inextricable confusion. The region, which has been aptly termed "a sea of mountains" and "a jumble of mountains," is covered with the snow of ages, through which at intervals pierce black masses of jagged rock, breaking the monotonous whiteness of the scenery but intensifying its barrenness. Lifeless, bleak, and forbidding, this waste of snow and ice and crag stretches back from the coast as far as man has

penetrated. The character of this region explains why the boundary of Southeast Alaska has never been actually laid down upon the ground.

Along the upper portion of the *lisière* the mountains are less confused. A short distance north of Lynn Canal a clearly-defined range divides the watershed of the upper Yukon from the small rivers flowing south. It is through these mountains that the Chilkat, Chilkoot, and White Passes give access to the gold fields of the Klondike. Then, from Mount Fairweather, which rises a few miles to the northwest of Cross Sound, a chain of lofty mountains, which reach an altitude of over 10,000 feet, extends along the coast to the towering peak of St. Elias,

> ———— the silent Sentinel,
> Which, garbed in its eternal white,
> Keeps endless vigil o'er the slumbering North.

On account of the ruggedness of the shores, nearly all of the rivers of the *lisière* are mere torrents, which rise within a few miles of the ocean. Four—the Stikine, Taku, Chilkat, and Alsek—flow across the inland boundary. The Stikine is navigable for light draught steamers for 150 miles; the others can be ascended only in canoes. Except by these four rivers and the passes north of Lynn Canal the impenetrability of the mountain fastnesses prevents access to the interior.

On October 18, 1867, the formal transfer of the territory took place at Sitka, which is situated on the western coast of Baranof Island. A military government was established, which continued until 1877, when the authority passed to the Navy Department. In 1884, under an act of Congress, the present civil government was organized.

During the thirty years succeeding the cession, the marking of the boundary of Southeast Alaska formed the subject of frequent negotiations between the United States and Great Britain; but the difficulties and expense which a survey would entail were constant obstacles to the undertaking, although the importance of the Stikine River as a route to the gold-bearing Cassiar District of British Columbia, the discovery of gold in the neighbourhood of Lynn Canal, and the exploration of the mountain passes near its head made more apparent each year the necessity of laying down the boundary.

At first the line usually shown upon the maps had been accepted in the United States, Great Britain, and Canada as being approximately correct, but with the growing importance of the possession

of the head of Lynn Canal the description in the Anglo-Russian treaty of 1825, by which the boundary had been established, and which had been repeated *verbatim* in the treaty of 1867, received considerable attention in Canada, particularly in British Columbia. Certain ambiguities and uncertainties of language were found, which were seized upon as the basis for a new interpretation of the treaty, by which the line would be drawn across Lynn Canal, placing the upper portion within the British possessions. While this theory for years was not openly accepted by the British Government, it found many advocates throughout the Dominion, and finally during the sessions of the Joint High Commission in 1898 the British Commissioners advanced it as a correct construction of the treaty description.

Prior to the issue being definitely raised in regard to the meaning of the treaty, the United States and Great Britain had in 1893 and 1894 made a joint survey of the coast of the *lisière*, which, although furnishing valuable data for the final determination of the controversy, brought the matter no nearer settlement. The discovery of the Klondike gold fields in 1896 was followed by the rush of thousands into the region, the large majority entering by way of the mountain passes near Lynn Canal. With the boundary undetermined there was considerable friction and conflict of authority between the American and Canadian officials charged with the enforcement of the laws and the preservation of order. A settlement of their respective jurisdictions became imperative, and so, upon the failure of the Joint High Commission to reach an agreement, the two Governments entered into a *modus vivendi*, establishing a provisional line on the routes between Lynn Canal and the headwaters of the Yukon. This line, which was marked upon the ground in 1899, lies much nearer the sea than the boundary fixed by the recent award.

The temporary arrangement as to jurisdictional limits, though relieving a most undesirable condition, was satisfactory to neither Government; and, finally, after four years more of negotiation, a treaty was signed on January 24, 1903, submitting the questions at issue to the Tribunal, which recently met at London and by its award ended the controversy which has been a cause of much bitterness between the United States and Canada and an obstacle to the settlement of other differences between the two countries.

The questions which the treaty presented to the Tribunal for its adjudication were seven in number, and involved the true intent and meaning of the description of the boundary as set forth in

Articles III and IV of the Anglo-Russian treaty of 1825. Without giving the exact language, these Articles may be thus stated: The line was to begin at the southernmost point of Prince of Wales Island, in latitude 54° 40′, and ascend northerly along Portland Channel to the 56th parallel of latitude, from which point it was to follow the crest of the mountains situated parallel to the coast as far as the 141st meridian of longitude west of Greenwich, which meridian was to form the boundary northward as far as the Frozen Ocean. It was further provided that, wherever the crest of the mountains extending parallel to the coast should prove to be more than ten marine leagues (approximately 34½ statute miles) from the ocean, then the line should run parallel to the sinuosities of the coast, but never more than ten marine leagues therefrom.

The questions submitted to the Tribunal and the answers which each Government claimed should be made to them, are briefly as follows:

The first question was, What point is the beginning of the line? Both parties asked that the answer be "Cape Muzon."

The second question, What channel is the Portland Channel? The United States claimed that it was the broad arm of the sea known for fifty years as "Portland Inlet," and its northern branch which is named on all maps "Portland Canal." Great Britain agreed that Portland Canal was the upper part of the channel, but asserted that the narrow passage north of Portland Inlet, now called Pearse Inlet, was the lower portion. The difference involved the title to one-half of Portland Inlet and the islands along its northern side.

The third question asked was, What course the line should take between the place of beginning and Portland Channel? Both countries claimed that it should be a straight line.

The fourth question, To what point on the 56th parallel should the line be drawn from the head of Portland Channel, and what course should it follow between these points? This question was made necessary from the fact that, although the treaty of 1825 appeared to assume that the 56th parallel crossed Portland Channel, it in reality lay some distance north of its head. The United States asked that the line on reaching the mainland should be continued on the same course to the parallel, a distance of about 5½ miles. Great Britain claimed that the point on the parallel to which the line should be drawn was where it was intersected by the mountains which were, under the treaty, to form the boundary northward of that parallel.

The fifth question—and the one of greatest importance—was this, Was it the intention and meaning of the treaty of 1825 that Russia should have a continuous strip or fringe of coast on the mainland extending from the 56th parallel to the 141st meridian, and separating the British possessions from salt water at every point? The United States asked for an affirmative answer; Great Britain, for a negative one.

The sixth question (the language of which is rather obscure) was contingent upon the answer made to the fifth question. As the contingency did not arise, and the Tribunal declared an answer was unnecessary, we need not consider it.

The seventh and last question was, What mountains, if any exist, are those which parallel the coast and form the boundary north of 56°, when not more than ten marine leagues from the ocean? The United States asked the Tribunal to decide that there was no continuous range of mountains within ten leagues of the ocean, such as was intended by the treaty. Great Britain claimed that such mountains did exist, and that they were those which rose immediately from the water's edge.

Upon the map (facing page 128) the British line is the one running very close to the outer shores of the mainland. It will be seen to cross all the large bays and inlets. The next line inland is the one of the Award. The line furthermost inland, which winds around all the indentations of the coast and never approaches nearer than within ten marine leagues of tide-water, was not directly claimed by the United States, but was laid down as a guide to the Tribunal in determining the line, provided no mountains were found to meet the provisions of the treaty.

It was necessary for Great Britain to establish three propositions in order to obtain the line which she claimed. First, that it was not intended by the treaty that Russia should have a continuous strip of land along the coast. Second, that the mountains referred to in the treaty did exist. And, third, that the particular mountains of the British line fulfilled the treaty provisions. The failure to establish any one of these propositions would break down the theory upon which the line was constructed, and the failure of the first, which depended on the answer made to the fifth question, would destroy it utterly. It is apparent, therefore, that the very heart of the controversy lay in the fifth question, which may be thus stated: Did the boundary run around all arms of the sea without touching any of them?

While the other questions were largely a matter of geographical

fact, this question was one of the intention of the parties and the meaning of the treaty. The chief source for determining these was the negotiations which led up to the treaty of 1825. They extended over a period of three and one-half years, and are fully detailed in the voluminous correspondence which was laid before the Tribunal. Time will permit only a brief reference to this important branch of the evidence.

The negotiations originated in an imperial ukase promulgated by the Czar in September, 1821, by which he prohibited all persons from approaching within 100 Italian miles of the coasts and islands of Northwest America as far south as Vancouver's Island in latitude 51° north. The object of this ukase was to preserve to the Russian American Company, a corporation which had been granted the exclusive rights of government, colonization, and trade throughout the Czar's American possessions, its monopoly of the fur trade, which had been seriously menaced by American trading vessels, which frequented the region in constantly increasing numbers.

The United States and Great Britain, upon being advised of this assertion of extraordinary jurisdiction over the high seas, entered vigorous protests, which resulted in a suspension of the edict until the rights of the parties could be determined by treaty. The grounds of protest were two: first, that the extension of municipal authority beyond three miles from the coast was contrary to the practice of nations; and, second, that Russia's claim of territory rested upon no valid title. The freedom of navigation was of equal interest to the protesting Powers; the limitation of Russian territory, to Great Britain in particular.

The Hudson's Bay Company had crossed the Rocky Mountains, and, though still 70 miles from the ocean, it had several stations between 53° and 55° of north latitude. The possibility of water communication between the Pacific and the British trading posts in the interior, and of the establishment of a station upon the coast for the transshipment of furs and supplies, made it desirable for Great Britain to prevent Russia from extending her dominion south and east. On the other hand, it was necessary for Russia, in order to safeguard the monopoly of the Russian American Company, to prevent the erection of rival trading posts on the islands or adjacent mainland, to which the natives could resort, and from which foreign traders could operate. This was the prime object of the Russians throughout the negotiations.

At the outset Russia, abandoning her claims south of Dixon Entrance, proposed that the boundary should run through Port-

land Channel, and thence follow the mountains, extending parallel to the sinuosities of the coast, as far as the 139th meridian. Great Britain attempted by several counter proposals to obtain concessions which would insure to her subjects a foothold upon the coast north of Dixon Entrance, but Russia remained firm in her demands, only modifying them to the extent of limiting the width of the *lisière* to ten marine leagues when the mountains were further than that distance from the coast, and to changing the 139th to the 141st meridian. Great Britain finally assented, and the treaty was signed on the last day of February, 1825.

It is evident that a most important question in determining the intent of the parties was, To what mountains did the Russian plenipotentiaries refer in the negotiations? The only thing that the correspondence shows is that the negotiators took it for granted that a mountain range paralleled the coast. There is nothing further to identify it. As there were no published descriptions of the regions inland, this belief must have originated from examining maps, and so the maps consulted by the negotiators were most material in determining these mountains and, through their location, the intention of the parties as to the course of the boundary.

It was established with approximate certainty before the London Tribunal that these maps were those of the British explorer Captain George Vancouver, a map issued in 1802 by the Russian Quartermaster-General's department, and a map published by James Wyld at London in 1823, known as the "Faden Map."

Certain coincidents exist between the "Faden Map" and statements in the correspondence which prove, almost beyond controversy, that it was the one chiefly relied upon by the negotiators. On all these maps appears an unbroken chain of mountains winding around the indentations of the coast at a short distance from salt water, and extending from Portland Canal to Mount St. Elias.

The United States claimed that these maps were conclusive evidence of the mountains of which the Russians spoke. Great Britain claimed, on the contrary, that the negotiators must have known that the maps were uncertain, and that they did not rely upon them to locate the mountains, but left that for future survey.

The agreement as to the limitation of the extreme width of the *lisière* to ten marine leagues introduced another factor into the problem of locating the boundary. It was this: From what points should the limit be measured inland in case the mountains were not within that distance? The treaty in one place says "the ocean"; in another, "the sinuosities of the coast." Both parties

agreed before the Tribunal that the two terms were synonymous. But what did the negotiators intend by the words "ocean" and "coast"? If no mountains, such as the treaty presumed, were found to exist, then the location of the boundary hinged on the interpretation given to these words.

Great Britain contended that "coast" in the treaty meant "the general trend of the coast," and that in drawing the coast-line all inlets not exceeding six miles in width should be ignored.

The United States denied this contention, and asserted that an artificial coast-line, such as Great Britain urged, was never employed except to determine the extent of municipal jurisdiction over adjacent waters; that no instance could be cited in which it was used for fixing a boundary; and that in any event, since the artificial—or more correctly, the *political*—coast of Southeast Alaska left the mainland at Cross Sound and passed *outside* the entire archipelago before again touching the continent, it could not have been the one intended in the treaty. The American contention was that the coast from which the ten-league limit should be measured was the *physical* coast-line of the mainland—that is, the dividing line between land and water, and that such a coast followed the shores of every inlet without regard to its length or breadth.

It was urged that what Russia sought throughout the negotiations was to obtain a land barrier which would prevent British traders from making settlements on the shores along which the Russian Company traded; and that, if the plenipotentiaries of Russia had based the ten-league limit upon a coast-line which would leave the heads of all the principal inlets within the British dominions, they would have entirely failed in the chief object sought by them; while manifestly, from the history of the negotiations, they had been successful.

Furthermore, the language of the treaty was "the *sinuosities* of the coast," not "coast" alone; and the word "sinuosities" could not be ignored, and could only refer to the bays and inlets.

In addition to these points the United States directed the attention of the Tribunal to the maps consulted by the negotiators, pointing out that the chain of mountains shown on them paralleled the physical coast-line and not the "general trend of the coast," and that this proved the character of the coast referred to in the treaty.

Thus it was argued, from the common and usual meaning of the word "coast," that the mountain boundary was to pass around the

heads of the inlets; and, conversely, from the fact that the chain of mountains on the maps *did* pass around the inlets, the word "coast" was used in its common geographical sense.

A large mass of evidence was also laid before the Tribunal showing that subsequent to the treaty both Russia and Great Britain recognized the boundary as running along the coast without touching the shores at any point. Time will not permit a review of this class of evidence, which consisted of a great number of maps and charts and numerous documents proving acts of sovereignty at the heads of the inlets by Russia and the United States and the recognition of such sovereignty by British and Canadian authorities.

The maps of Alaska, which, prior to the meetings of the Boundary Tribunal, had been so largely relied upon by American writers as furnishing conclusive evidence of the actual location of the boundary, were never so considered by the Tribunal nor by the American counsel. In those emanating from official sources in Russia, England, or Canada, which were the only ones of value as evidence of the intention of the parties to the treaty, the discrepancies were too great to attempt to prove by them more than that the parties understood the treaty to mean that the line should never touch salt water between Portland Canal and Mount St. Elias.

The occupation of the *lisière* by Russia and, after the cession, by the United States, particularly at the head of Lynn Canal, was proved to be as full and complete as the nature of the country permitted, and to this occupation Great Britain made neither protest nor objection, thus tacitly acquiescing in the interpretation placed upon the treaty by Russia and this country, until the discovery of gold along the upper Yukon made the ownership of the head of Lynn Canal of much moment to her Canadian subjects.

How much weight was given to the evidence which related to the acts of the parties subsequent to the treaty it is impossible to say; but it could hardly have failed to impress the minds of the Commissioners with the equity of the United States' case. Yet there seems little doubt but that the Tribunal relied chiefly for its decision upon the language of the treaty interpreted by the preceding negotiations. By that decision the fifth question was answered, as the United States claimed it should be, in the affirmative. The boundary was to be drawn *around* and not *across* the inlets.

Having found the intention of the treaty Powers as to the loca-

tion of the boundary in its relation to the inlets, it was necessary for the Tribunal to answer the seventh question, and determine whether there were any mountains in that locality which met the requirements of the treaty; and, if so, what the mountains were. The treaty phrase to be interpreted was "*la crête des montagnes.*" This would seem to indicate a chain of mountains such as appeared upon the maps before the negotiators. As a matter of fact, however, no such clearly-defined chain exists. Both parties agreed as to that. Still, about the head of Lynn Canal and between Mount Fairweather and Mount St. Elias there are dominant mountain ridges which practically, if not technically, fulfil the terms of the treaty.

As to the remainder of the line, it was contended on behalf of the United States that, since it was admitted that there was no continuous, dominant range, the Tribunal must fall back on the alternative boundary provided for by the treaty, and fix the line at a uniform distance of ten marine leagues from the coast. Great Britain, on the contrary, declared that "*la crête des montagnes*" did not indicate the crest of a *range*, but meant simply the *tops* of the mountains which rose nearest the coast—that is, the "general trend of the coast." Relying upon this interpretation the British counsel claimed that the boundary should be drawn as shown upon the map.

When, however, the Tribunal decided that it was the intention of the treaty that the boundary should pass around the heads of the inlets, the proposed British line became impossible. Nevertheless the British contention, that there *were* mountains which fulfilled the treaty stipulations without forming a continuous range prevailed. Since the United States had denied this proposition and Great Britain's mountain boundary was out of the question, the Commissioners reached a decision upon the seventh question, for which neither Government had contended.

The middle line upon the map, to which reference has been made, shows the mountains selected by the Tribunal as meeting the requirements of the treaty. There is nothing to indicate upon what theory or system these particular peaks and short ridges were chosen, but a comparison of this line with the mountain range upon the maps before the negotiators discloses that the boundary as finally settled follows very closely the trend of that fictitious range, particularly as shown on the Faden Map. Another noticeable fact is that the boundary of the Award follows along the outer margin of the surveyed portion of the coast. Either of these circumstances may be significant of the method employed in reaching

a decision; and yet both may be mere coincidents and nothing more.

There is a portion of the mountain boundary which the Tribunal left unsettled. It lies between two peaks, 125 miles apart. One rises a little north of the Stikine River; the other, north of the Taku. They are connected on the map by a dotted straight line. Of this section the Award says: "In the absence of further survey the evidence is not sufficient to enable the Tribunal to say which are the mountains parallel to the coast within the meaning of the Treaty."

The question next in importance to the fifth and seventh was the second, "What channel is the Portland Channel?" Two distinct channels connect the long, narrow fiord of Portland Canal proper with the ocean. The small one to the north of Wales and Pearse Islands is called "Pearse Inlet;" the large one south of the islands has been known for a long period as "Portland Inlet," though named on the accompanying map "Portland Canal."

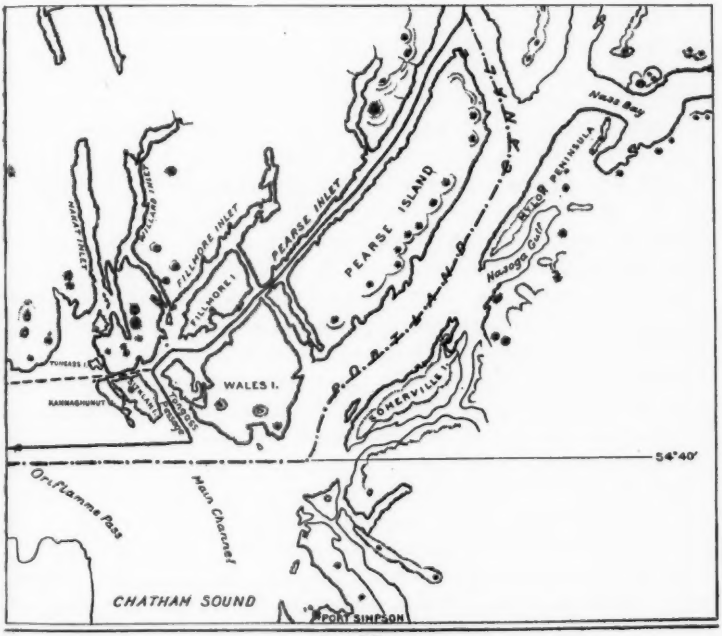
The United States asserted that the broad channel was the "Portland Channel" of the treaty, while Great Britain claimed that it was the narrow one. The portion north of the eastern end of Pearse Island was conceded by both parties to be a part of "Portland Channel." Near the entrance to Portland Inlet on the southern side is Port Simpson, which is to be the terminus of the proposed extension of the Canadian railway system. As a result the islands along the northern side of the inlet were considered by the Dominion Government of exceptional strategic importance. But for this fact the second question would have been of little moment, as the amount of territory involved was inconsiderable.

In favour of the British contention as to the location of "Portland Channel" there was substantially no doubt that Vancouver gave that name to the smaller channel, and the name of "Observatory Inlet" to the larger. This was not shown on his chart, but his Narrative was explicit in so designating them.

The United States, on its side, argued that there was no evidence that any of the negotiators ever saw or read the narrative of Vancouver, and that the probability was that they relied solely upon the maps in drafting the treaty and did not, in any event, trace out the intricate boat journey made by Vancouver through these waters, which was the only way in which it could be determined what channel he named "Portland."

Another important point in the argument of the United States was that in the Russian-American treaty of 1824, which was nego-

tiated at the same time that Great Britain was attempting to agree with Russia upon a boundary, the southern limit of the latter's possessions was along the parallel of 54° 40′. The entrance to Portland Inlet was shown to be exactly in that latitude. From this coincidence it was argued that the parallel pointed to the broad channel as the one which the line should follow, for it seemed probable that Russia intended to have her southern boundary the same in both treaties. In fact throughout the Anglo-Russian negotiations of



MAP OF PORTLAND CHANNEL.

EXPLANATION:
The line of dots and dashes is the boundary claimed by the United States;
the line of short dashes is the boundary claimed by Great Britain;
and the solid line is the boundary fixed by the Award.

1824 there was constant reference to 54° 40′ as the southern line of the Russian possessions.

However convincing such reasoning seems, the presumption that the negotiators carefully perused Vancouver's Narrative, which had had a wide circulation in both English and French editions and was the only authority upon the region, was too strong to be over-

come. Such at least was the opinion of the Tribunal, for it decided that the narrow northern channel was intended in the treaty by the name "Portland Channel."

An examination of the map will show that Pearse Inlet has two outlets to the ocean—one, north of Sitklan and Kanagunut Islands; the other and much the larger, between Wales and Sitklan Islands. Vancouver in his explorations passed through neither of these passages. It was impossible from his narrative to tell which one he named "Portland Channel." The legal presumption in such a case would be that the larger one was intended. Great Britain had drawn her proposed line through the narrow one north of Kanagunut and Sitklan, but had failed to support it by any evidence. The Tribunal, therefore, had no other course but to decide in favour of the larger channel, known as "Tongass Passage." By this decision Great Britain obtained the islands, Pearse and Wales, and the United States, Sitklan and Kanagunut.

While the award, as a whole, was received in Canada with dissatisfaction, this particular part of it aroused much harsh criticism, which was entirely unwarranted. Great Britain obtained the two large islands, *in spite of opposing evidence*, on the presumption that the negotiators had read Vancouver's narrative. The United States obtained the two seaward islands on the presumption that the explorer intended to name the larger opening into the ocean "Portland Channel," and *to this conclusion there was no contrary evidence.* Certainly the Commissioners showed no partiality to the United States in applying the principle of legal presumption.

It remains to refer briefly to that portion of the boundary lying between the head of Portland Canal and the 56th parallel of latitude. I have already stated the contention of the two Governments. The Commissioners seem to have followed the principle urged by Great Britain, that the point to be attained on the 56th parallel was where the mountains of the boundary intersected it. So the line, instead of following the valley of the Bear River, as contended for by the United States, was drawn along the ridge of the Reverdy Mountains, a mile or two west of it. Thus, while Great Britain succeeded in theory, the United States secured substantially all the territory that it claimed.

To recapitulate: As to two of the seven questions, namely, the *first* and *third*, there was no controversy. One other, the *sixth*, required no answer. The *second*, relating to Portland Channel, was

decided in favour of Great Britain, but her claim was so modified as to deprive her of the principal benefits sought. The *fourth*, which pertained to the drawing of the line between the head of Portland Canal and the 56th parallel, was to all intents decided as the United States claimed that it should be. The *fifth* and pivotal question, concerning the relation of the boundary north of the 56th parallel to the inlets, was answered precisely as the United States asked the Tribunal to find. The *seventh* question, which related to the existence and location of the mountains referred to in the treaty, was decided in favour of Great Britain in principle; but on account of the answer given to the fifth question, its practical application was favourable to the United States.

The result of the Tribunal's labours should be most gratifying to this country; not so much on account of what was secured under the Award as that it has brought to an amicable conclusion a controversy which has been an increasing cause of discord between the United States and Canada. From a mere question as to the most convenient mode of marking a boundary line upon the ground, it had grown to be the chief subject of dispute, overshadowing all other matters of disagreement between the two countries and barring the way to their settlement. Public opinion on either side of our northern frontier was hardening into a stubborn and unreasoning belief that there was neither justice nor equity in the claims of the other nation. When, therefore, the terms of the Hay–Herbert Treaty were made public, a very pessimistic view was taken of what it would or could accomplish.

The Tribunal created by the treaty was unique in constitution, being composed of an equal number of members from each country, without a foreign umpire to cast a deciding vote. It was constantly asked, "How could a Tribunal, so constituted, ever reach an agreement upon questions affecting the material interests of both countries?" It might benefit future negotiations by securing a full presentation of the claims of each nation. That it would do more than that seemed very doubtful. This, I believe, was the general and not unreasonable opinion. Too often, unfortunately for the cause of international arbitration, political motives rather than principles of justice have influenced the decisions of international courts, even when presided over by a third party. Compromise and concession, legitimate instruments of diplomacy but never of judicial tribunals, have been the foundation of many an international award. If these two modes of reaching an agreement could be eradicated, much of the remaining opposition to the arbitration

of disputes between nations would disappear. They are the chief stumbling-blocks to its progress.

The Alaskan Boundary Tribunal has done much to remove these objections. It has done more than appeals and arguments can do to arouse a favourable public sentiment and establish public confidence in the judicial determination of international controversies. It has proved that the deep sense of justice inherent in the Anglo-Saxon race can rise above national prejudice and the influence of national interest. It has paved the way for a general arbitration treaty between the United States and Great Britain which must soon become an accomplished fact.

To each member of that Tribunal honour in full measure is due for the determination, so constantly manifested throughout their sessions, to decide the questions submitted to them upon the weight of evidence and in strict accord with principles of justice. That the decision was not unanimous is no cause to impute to the two Commissioners who declined to sign the Award any motive for their act other than a firm conviction that it was not equitable in all its findings. Imputations such as have been made in some quarters reflect most unjustly upon the high character of the distinguished members who failed to agree with their colleagues, while denying to them that right of independent judgment which is as essential to international as to national judges.

It would seem to me inappropriate to close without paying a special tribute to the great English jurist who presided over the sessions at London. Tactful, considerate, and eminently fair to all, he prevented the occurrence of any unpleasant incidents during the heat of debate, such as have often in the past marred the dignity of international commissions. His name, long known and honoured by the bench and bar of both countries, has become the synonym, throughout the length and breadth of this Republic, for impartial and uncompromising justice. Lord Alverstone, as President of the Alaskan Boundary Tribunal, not only has added to his already enviable reputation as a great judge, but, with his colleagues, has rendered an inestimable service to the cause of international arbitration.

NOTES ON GEOLOGICAL SURVEYS.

THE VERMILION IRON-BEARING DISTRICT OF MINNESOTA.—This is the title of Monograph XLV of the United States Geological Survey, by J. Morgan Clements. It is in the usual quarto form, 466 pp., and is accompanied by an atlas.

This region is in the northeastern part of Minnesota, and embraces about 1,000 square miles. As nearly everywhere in the Lake Superior region, the rocks are of very great geological age. The relief is not great, and yet the country is rugged. The highest altitude is not much above 2,000 feet and the average relief approximates 500 feet. But owing to inequalities in structure and composition of the rocks, the surface is rough, marked by hills, great numbers of lakes, and swamps, or, as they are called by the Indians, *muskegs*, which represent formerly existing lakes, and now show conditions somewhat like the tundras of high latitudes.

Most of the drainage of the Vermilion District belongs to Hudson Bay, and is historically interesting as furnishing, in its strings of lakes, a convenient highway to the early fur traders of the Northwest. The lakes and streams trend northeast-southwest, and show thus the direction of the structural axis of the bed-rocks. The lake basins are interpreted as mainly due to preglacial valleys and glacial blockade. None were recognized as rock basins due to glacial excavation. The towns are few, and are all connected with the dominant industry. The body of the volume discusses the formation, the events of this most remote physical history, and the geological relations of the ores. The ores are chiefly hematite, and this alone is mined in the region. The ore bodies are lenticular in form and extend southwest-northeast, conforming in directions to the schists which inclose them. These deposits were first brought to public attention by J. G. Norwood in 1850, and again incidentally by a fruitless gold rush in the sixties. Actual development of these ores has extended over the past twenty-five years.

The relation of topography to geology is brought out in a brief chapter near the close of the monograph. Anticlines of older rocks, as a rule, form the ridges; while the valleys follow synclines of younger and softer rocks. Similar is the relation between the numerous salients and reëntrants found on the borders of the larger lakes. In some cases the forms of the lakes are plainly dependent on the direction of the jointing.

THE MESABI IRON-BEARING DISTRICT OF MINNESOTA.—This is the title of Monograph XLIII, in the same series with the last described, and the author is Mr. Charles Kenneth Leith. Monographs on the Marquette and other Superior districts have already appeared, and it is proposed later to issue a summary volume on the geology of the Lake Superior region as a whole.

The area treated by Mr. Leith has special interest for its great open-pit workings and as being the largest iron-producing group of mines in any land. This fact is the more startling when it is remembered that the first railroad and the first shipments date from the autumn of 1892. In that year 4,245 tons were shipped. In 1902 the total had risen to 13,329,953 tons.

The several chapters of the Monograph are devoted to history and literature of the field (II), the geology (III–VII), the iron-ore deposits (VIII), origin of the iron ores (IX), and mining, transportation, etc. (X). A short closing section treats of the methods and possible results of further exploration.

The ore bodies are of various sizes, ranging up to a quarter of a mile, not often more, in width, and with lengths of half a mile or more in many cases. The depth of the ore ranges from about 50 to 350 feet, though most deposits fall below 200 feet. The ores are mostly hematites, with a small percentage of combined water. Ore is seldom mined on the Mesabi range, which does not show 58 per cent. or above of iron. All the ore is bedded, and much of it is earthy in texture.

In mining, the glacial drift is first stripped off, averaging in depth from 20 to 40 feet. Railway tracks, of standard gauge, are carried to the deposit, and the ore is excavated with a steam shovel. As the excavated strip is widened, lower levels are opened up, until the pit becomes of enormous size, with a labyrinth of tracks, and with several ore trains, possibly, in process of loading at one time. Underground methods are used, but to a minor degree, and in special cases, to avoid heavy stripping, the construction of graded approaches, or the interruptions of climate. The delivery of the ore at the Lake Superior docks and its water transportation to points of consumption are well known.

Exploration of new territory is carried on by test pitting, or by churn or diamond drilling. Two hundred drills are said to have been continuously in use in the Mesabi district in the previous year.

GEOLOGY AND WATER RESOURCES OF THE SNAKE RIVER PLAINS OF IDAHO; ISRAEL C. RUSSELL, BULLETIN 199, U. S. GEOLOGICAL

SURVEY; ALSO, GEOLOGY OF SOUTHWESTERN IDAHO, AND SOUTHWESTERN OREGON, SAME AUTHOR; BULLETIN 217.—These papers possess much geographic interest, from their abundant and vivid descriptions of climate, topography, and resources, but are here cited more particularly for their contributions to our knowledge of volcanic operations in the Cordilleran region. The Snake River lavas form a plain about 20,000 square miles in extent, stretching in a crescent from near the western border of the Yellowstone Park to Boise. The concave border of this curved belt is toward the north, and the river is near its southern boundary. A curious consequence is that perennial streams, with small exception, do not reach the river from the lofty mountains on the north, the waters being swallowed up in the cells and fissures of the lava, and issuing in a remarkable series of strong springs along the north walls of the Snake River Cañon. In particular, at the Thousand Springs, innumerable torrents spring from the cañon walls and break into foam as they fall. These springs and the various falls along the river make an enormous resource of power for Southern Idaho.

From the scientific point of view, the most interesting conclusion of the author is that these lavas are not, in accordance with the general view, the product of fissure eruptions, but rather the result of the effusions, at many vents, of very liquid lavas. Scores of such points of outflow were recognized, and others were safely inferred to lie beneath coverings of later lava. Thus broad and very flat cones were formed, often not more than 200 or 300 feet high, but 8 or 10 miles in diameter at the base, and merging so gradually with neighbouring flows that often the eye cannot pick out the line of demarkation. The slope for the flow of the lavas had often to be produced by the thickening of the lava sheet around the orifice. The lavas often enter deep embayments in the mountains north or south. In some cases the streams actually poured into these valleys from vents on the plains, like the tide entering gulfs on the sea border; while in other cases the lavas proceeded from vents in the uplands and flowed down the valleys like rivers entering the ocean. For these results remarkable fluidity of the lavas was requisite, and flows were traced, in some cases, for 50 miles.

The reader is referred to the two reports for the many details of volcanic work and volcanic formations, here seen as vividly as in the study of modern Hawaii or Vesuvius. Among these are the cinder buttes, the breached cones, the crags of tuff carried out and still resting on lava flows, and the great variety of volcanic bombs

and lava splashes, showing conditions of fusion, manner, or extent of aerial transit, etc. All these features are well illustrated with photographs, and the bulletins could be read with great profit by students and teachers of geology and geography.

A. P. B.

THE NEW SEAPORT OF ZEEBRUGGE, BELGIUM.

In mediæval times the City of Bruges ranked among the most flourishing of European ports. At that period Bruges held direct communication with the North Sea by means of an estuary; but gradually this was filled up with sand, and the old Hanseatic town fell from its high estate.

At the present day vast maritime undertakings are being developed, with the two-fold object of reviving the commercial prosperity of Bruges and of founding a port of call for the whole country. The new town has been christened Zee Brugge (Bruges-on-Sea).

For a port of call the Belgian coast is advantageously placed, as its situation is such that it can admirably knit together both land and sea going traffic without loss of time, uniting security with rapidity to such a degree that the mechanism of transit is perfected. On the one side a continuous current of merchandise passes within sight of the Belgian coast, conveyed by the great German shipping lines from Hamburg and Bremen, and on the other a radiation of railways stretches towards Paris, Berlin, St. Petersburg, Vienna, Constantinople, and Italy. These two great trade lines, converging on Zeebrugge, will be of mutual assistance, and will enormously facilitate the inflow of produce all over Europe.

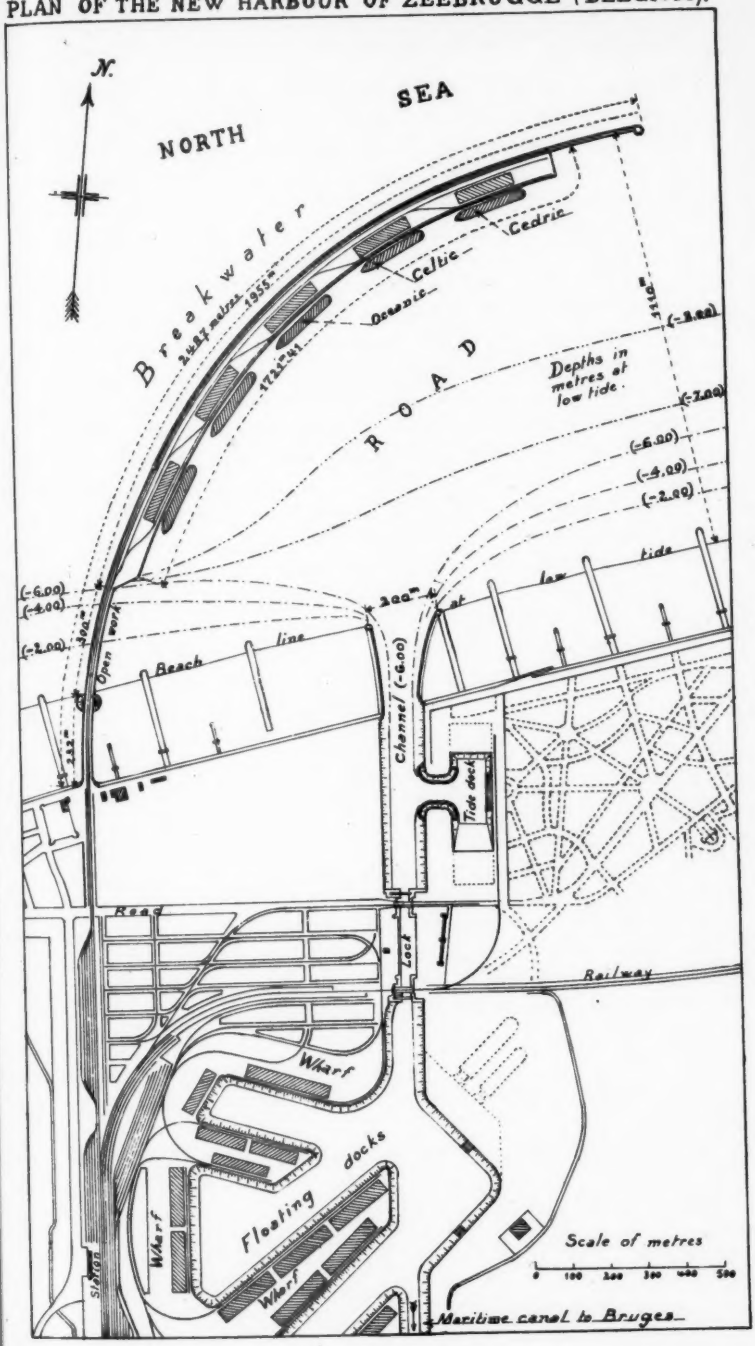
The works in progress consist of three parts: the actual port of call at Zeebrugge, the canal uniting Bruges and the sea, and, lastly, the local installations at Bruges.

As the plan shows, the chief feature of the port of call is an immense breakwater or pier which runs out from the land, curves to the east, and finally stretches parallel to the coast 1,200 yards from low-water mark.

This breakwater encloses and protects against the prevailing south and northwest winds a harbour 420 acres in extent.

The breakwater consists of three parts. From the shore runs

PLAN OF THE NEW HARBOUR OF ZEEBRUGGE (BELGIUM).



a solid pier to the distance of 253 yards; then come 328 yards of open work, and this is followed by another length of solid masonry measuring 2,138 yards—in all, more than 2,700 yards.

The object of the open-work portion is to maintain as far as possible the circulation of the tidal currents in the harbour, in order that the mud may not settle. Here it may be remarked that the actual landing-stage is situated outside the zone of water subject to the influence either of tidal movements or of the Scheldt.

There is very little sand, and silting is not a menace as at other points of the coast. However, considerable quantities of mud are held in suspension in the sea, and it is to prevent the gradual sinking of this mud in the harbour that the open work has been built. This arrangement is quite an innovation, and minimises the difficulties experienced in constructing an artificial port on a muddy shore.

The open work part is of steel. It is 13 yards wide, has two lines of rail (each 1.64 yard in width with a 9-foot way between) and two side passages of about 3 yards each. The superstructure rests on iron pillars driven into the ground.

The third part of the breakwater, a continuation of the open work, is also an innovation. It consists of two parallel walls enclosing a space 81 yards in width and forming a vast platform. The outer wall protects the platform against the violence of the sea; while the inner or harbour wall forms a quay alongside which ships can be berthed and unloaded.

The outer wall is built on a foundation of concrete blocks each 3,000 tons in weight, 27 yards long and 8 yards wide. The height of these blocks varies according to the depth of the sea, in order that the top may always be just a yard above low-water mark. On these blocks three other layers of concrete are placed in masses of 55 tons till a height of seven yards and a thickness of ten yards are reached. Crowning all this is a slighter sheltering wall some five yards high. At the extremity of the breakwater a lighthouse will be built. The length of the inner wall of the platform on the harbour side is 1,882 yards.

The depth alongside the quay is:

(*a*) For 800 yards, low water 26 feet 3 inches, high water 41 feet 4 inches.

(*b*) For 390 yards, low water 31 feet 2 inches, high water 46 feet 3 inches.

(*c*) For the remaining part (492 yards), low water 37 feet 9 inches, high water 52 feet 10 inches.

No continental port can show such anchorage, and it is clear that Zeebrugge is capable of meeting the most exacting demands made by the unceasing growth of modern commerce.

The quay, like the breakwater, is built up of concrete, and, where the anchorage is deepest, the foundation consists of huge blocks varying in length from 26 to 33 yards and weighing as much as 9,000 tons. The superstructure is formed of the smaller 55-ton blocks. On this will be laid out railways, a station for passengers, sheds for goods, electric cranes, etc., all with the latest improvements. It will be possible to load and unload directly from the railway, so that not a moment will be lost, and, as this railway will be the starting-point for all parts of Europe, trade will more and more tend to converge towards Zeebrugge.

At a distance of 900 yards from the shore end of the breakwater is the channel, giving access to the lock which affords entrance to the interior docks of Zeebrugge and the Bruges Canal. The opening and shutting of the lock are effected by electric power. This lock is 66 feet wide; the depth of the water varies from 18 feet to 30, according to the tide. The interior docks of Zeebrugge consist of a central dock, 720 yards long, a wet dock that will allow a ship 720 feet long to turn, and a series of small docks to the west.

The new canal runs in a straight line to Bruges. It is $6\frac{1}{2}$ miles long, 25 feet deep, and 72 feet wide at the bottom. It reaches to the new docks at Bruges; two large wet docks, and a third with turning room for a 520-foot vessel.

The quays have railways, sheds, and steam cranes.

The work was begun in March, 1896, and will probably be finished in 1905, at a total cost of 2,400,000 pounds sterling.

C. Piens,
Ingénieur principal des Ponts et Chaussées.

Bruges, 10th February, 1904.

RIVER SURVEYS IN THE UNITED STATES.

An important geographic work, begun a year ago by the topographic branch of the United States Geological Survey in co-operation with the hydrographic branch of the same bureau, is the survey of the rivers of the United States. The purpose of these surveys is to study in detail all those facts connected with the river systems, including slope, character of beds and banks, and discharge, which may have any bearing upon the problems of the development of such streams and sources of water-power or supply. In other words, these river surveys are to become complete topographic, hydrographic, and economic studies of all rivers of the country. This is a geographic work of the broadest scope, in that many of the branches of geographic science are outlined in the progress of the investigation.

As developed in the field work of the past year, and in the office work of studying the results during the current winter, these surveys will be conducted on the following general lines: The topographic branch will make topographic surveys of the beds and banks of the streams from above tide-water to the highest points on the tributary streams at which the volume of the discharge will warrant the making of the investigation. This survey consists in the transverse or meander of the stream bottom, mapped on the scale of 2,000 feet to one inch, showing the outlines of the banks, islands, rapids and shoals, tributary streams, swamps, etc. Contours of 10-foot interval are sketched, showing the crossings of main water surfaces and the topography of the surrounding stream valley to a distance of a few hundred feet. The route traversed is accompanied by a line of careful levels tied to the precise level net of the United States, thus reducing them to mean sea-level. In the course of these levels benchmarks are set at every mile, and elevations are recorded at all changes in water surface, tops and bottoms of rapids, junctions with tributaries, etc. Running notes are kept of the character of the vegetation, forestry, rock, and industries along the streams.

The resulting maps drawn up in office by the topographers will be published in two forms; first, the condensed profile of the water surface accompanied by a list of elevations, with descriptions of benchmarks and a brief report of the physical characteristics of the stream and its economic possibilities. These results are to be

published in the annual report on stream gauging issued by the hydrographic branch in its series of water supply papers. Secondly, the hydrographic branch will meantime conduct observations over a period of years to determine the discharge of each stream, and a water supply engineer will examine the stream with a view to determining possibilities of constructing dams for development of water-power or for water storage. As soon as sufficient data are available, there will be issued, in folio form, similar to the geologic atlas of the United States, separate folios for each river system, accompanied by the topographic map resulting from the route surveyed, a detailed profile, the results of the hydrographic studies of the discharge, etc., and the report on the availability of the stream for water-power or supply.

During the past season the following streams were surveyed in the manner above described:

UPPER EASTERN MISSISSIPPI.—Chippewa River, Wis., 42.5 miles, from Chippewa Falls to The Forks, near Flambeau.

KENNEBEC.—Kennebec River, Me., for 135 miles, from tidewater near Hallowell to Moose Head Lake, Me.

TENNESSEE.—Buffalo River, Tenn., 47 miles, from near Flat Woods to near Buffalo.

TENNESSEE.—Notteley River, N. C., Ga., 38 miles, from near Murphy, N. C., to near Blairsville, Ga.

TENNESSEE.—Hiwassee River, N. C., Ga., 63.3 miles, from Hiwassee to Tennessee State line near Apalachia.

TENNESSEE.—Toccoa River, Ga., 37.5 miles, from near Dial, Ga., to Tennessee State line, near McCays, Tenn.

SANTEE.—Catawba River, N. C., 45 miles, from near Marion to near Connelly Springs.

SAVANNAH.—Tallulah, Tugaloo, and Savannah Rivers, Ga., S.C., 95 miles, from Tallulah Falls to mouth of Broad River, near Lisbon, Ga.

SAVANNAH.—Tallulah River, Ga., 29.3 miles, from near Tallulah Falls to near Blalock, Ga.

SAVANNAH.—Broad River, Ga., 66.5 miles, from its mouth near Lisbon Point to near Carnesville, Ga.

ALTAMAHA.—Alcovey River, Ga., 18.3 miles, from its mouth near Worthville to Dailey's Bridge, near Starsville.

ALTAMAHA.—South River, Ga., 56.8 miles, from Constitution to its junction with Yellow River, near Worthville.

ALTAMAHA.—Ocmulgee River, Ga., 49.5 miles, from mouth of Yellow River, near Worthville, to Macon.

ALTAMAHA.—Yellow River, Ga., from its mouth near Worthville to near Yellow River, 57.3 miles.

ALTAMAHA.—Towilaga River, Ga., 21.7 miles, from near Berner to High Falls.

CHATTAHOOCHEE.—Soque River, Ga., 8.8 miles, from its mouth near View to Clarksville.

CHATTAHOOCHEE.—Chattahoochee River, Ga., 64.7, miles, from Chattahoochee to Franklin, and from near Chestatee to near Santee, 55 miles, and from near West Point to near Columbus, 35 miles.

CHATTAHOOCHEE.—Chestatee River, Ga., 47.7 miles, from Willow to its mouth near Chestatee.

SAVANNAH.—Chattooga River, Ga., S. C., 29.3 miles, from its mouth near Tallulah Falls to near Russell, S. C.

GEOGRAPHICAL RECORD.

AMERICA.

THE PAN-AMERICAN RAILROAD.—Marked progress is being made towards carrying out the Pan-American railroad project. Mr. Charles M. Pepper, Special Commissioner appointed by President Roosevelt, has returned from his visit to the Latin-American Republics. He found a very friendly disposition on the part of the various countries, some of which have adopted special legislation in the interest of the intercontinental railroad connection. Several countries are building railroads along the lines of the intercontinental surveys, while in other countries concessions have been made with this special end in view. His full report will be issued in a short time. (*Bull. of the International Bureau of Amer. Reps.*, February, 1904.)

THE DELTA OF SAINT CLAIR RIVER.—The fact that the St. Clair River, flowing out of one of the Great Lakes, (Lake Huron,) has built a fairly large and quite broad delta where it emerges into Lake St. Clair, has been the cause of much wonder on the part of those who have seen and have become familiar with its existence by the map, but have no knowledge of its immediate surroundings and causes. This delta has recently been made the subject of a paper by Cole, published by the Michigan Geological Survey (Vol. 9,

Part I). In this paper the author has made a study of the materials composing the delta, and also of the causes for its development in this peculiar situation. Normally, an outflow from a large lake should be free from sediment, and therefore incapable of building a delta in the brief period of time which has elapsed since the withdrawal of the glacier from this region. One reason why this delta has been possible in Lake St. Clair is the shallowness of the lake itself, thus requiring but a small accumulation of sediment to build the delta up above the lake level. It has been found by borings that the delta rests upon the older clay at a depth of from 14 to 16 feet. A second reason why the delta has been possible here is the drift of wind-formed currents along the shore of Lake Huron toward the St. Clair outlet. These currents, driven before the prevailing west winds, furnish a supply of sediment which, under other conditions, would not be present in the outflow of a large, deep lake. The time required for the formation of this delta is estimated by Cole to be somewhere between five and ten thousand years, and the time necessary for the completion of the filling of Lake St. Clair to be between twenty and forty thousand years. R. S. T.

Climate of Panama.—The climate of the Isthmus of Panama is distinctly tropical in character. The width of the isthmus is so slight (about 40 miles) and the continental divide so low (but little more than 300 feet above mean sea-level) that the Atlantic and Pacific necessarily affect the climate in a very marked way, the winds blowing across the entire isthmus almost unobstructedly. The marked characteristic of the climate as a whole is its prevailing uniformly high temperature and great humidity, the combination of the two giving the "hot-house" quality to the air which northerners find so depressing and enervating. At Colon the temperature does not often rise above 90° Fahr., although it has exceeded 98°. The usual monthly maximum temperatures range from about 85° to 91° or 92°. The mean monthly minimum temperature is but little below 70°. The mean annual temperature is about 80°. For ordinary purposes there is no noteworthy difference in temperature between the Atlantic and Pacific sides of the isthmus, but there are marked differences in the rainfall. The point about the Isthmian climate, as in the case of other moist tropical climates, is not that the dry-bulb temperatures are excessively high, but that the heat is continuous throughout the year, and that this heat is not dry, but moist. The seasons on the isthmus are not divided according to differences of temperature, as with us, because

these differences are so slight, but, as elsewhere in low latitudes, they are based on the distribution of precipitation. The dry season extends from January to April, although this does not mean that absolutely no rain falls then, and the wet season extends from May to December. The Colon side has a good deal heavier precipitation than the Panama side, the mean at Colon being about 125 to 130 inches, and at Panama a little over 65 inches. Most of the foregoing facts are based on an article by Hon. Wm. H. Burr, in the *National Geographic Magazine* for February. R. DeC. W.

METEOROLOGICAL STATION ON THE ISLAND OF AÑO NUEVO.—The Argentine Republic has decided to give a permanent character to the first-class meteorological and magnetic observatory on the Island of Año Nuevo, in the vicinity of Staten Island, Lat. 54° 39′ south, Long. 64° 07′ 30″ west. This observatory was established in order that observations might be taken there in connection with the International Antarctic Expedition. The island is small and elevated but little above sea-level, and the observatory is erected under excellent conditions at a distance of only six miles from the mountains of Staten Island. It is equipped with the complete instrumental outfit appropriate to a first-order station. At the end of the present year the observatory will begin to publish the results obtained during the International Antarctic Expedition, and also the observations of the current year. This observatory, and the new one proposed for Bahia Blanca, will form part of the system of observatories on the Atlantic Coast of Argentina under the supervision of the Argentine Ministry of Marine.

R. DeC. W.

EUROPE.

SURVEYS OF SCOTTISH LAKES.—The second report of Sir John Murray and Mr. Pullar on their surveys of the Scottish lakes (*Scot. Geog. Mag.*, Nov., 1903) is devoted to the lochs of the Tay basin. The largest and deepest of the lakes described is Loch Tay, whose greatest depth, as far as ascertained, is 508 feet. The trough form of lake beds is everywhere found, but in many of the lakes are several deep troughs, separated from one another by flat-topped elevations of the lake bottom. No explanation is given of the observed fact that the greatest depths are often found in the upper part of the lake.

ICELAND WEATHER AND THE WEATHER OF NORTHWESTERN EUROPE.—Hann has recently investigated the anomalies in the

weather of Iceland during the period 1851–1890, and their relations to simultaneous anomalies in the weather of northwestern Europe (Akad. Wiss. Wien, math.-naturwiss Kl., Jan. 7, 1904). As a basis for this study there are taken the monthly and annual mean temperatures and pressures, at Stykkisholm, for the period from 1846 to 1900, and the precipitation for 1857 to 1900. From these data the departures of the monthly means of these different elements from their 50-year means are determined. These departures are compared with the temperature departures at Greenwich, Brussels, and Vienna for the same period. Further, the departures of pressure and rainfall at Brussels and of the pressure at Vienna were determined, but partly for the winter only. The general results are as follows: For the three winter months the pressure departures in northwestern and in central Europe are, in 70 per cent. of the cases, the opposite of those at Stykkisholm at the same time. In the case of temperature the probability of an opposite condition is only 0.56. When the pressure departure of a month at Stykkisholm is negative, the probability of a simultaneous positive departure in the temperature of northwestern and central Europe is 0.82. When the pressure departure is positive, the probability of a negative temperature departure is 0.73. In winter every considerable pressure departure in Iceland involves, with a probability of 0.86, a temperature departure in the opposite sense in northwestern Europe; in summer the probability is 0.70. As the result of this study, there is strong evidence that the mild climate of northwestern Europe, and even of central Europe, is, in the first instance, dependent upon the Iceland barometric minimum.

Hann has further investigated the relations between the simultaneous pressure anomalies at Ponta Delgada (Azores) and at Stykkisholm, *i. e.*, in the two great "centres of action" of the atmosphere, as de Bort has called the permanent High near the Azores and the Low near Iceland, and finds that there is a certain interdependence between them. When the pressure at the Azores is above the mean, and the pressure at Iceland is below it, the normal pressure gradient over the Atlantic is increased; the atmospheric machine runs more quickly, and the favourable climatic conditions of Europe are accentuated. The cases of exceptionally high pressure near the Azores, and of exceptionally low pressure near Iceland at the same time, are a consequence of an increased activity of the atmospheric circulation. When the northeast trade is stronger than usual the high pressure to the right is intensified; the great whirl in the North Atlantic is increased, and the pressure at its

centre, near Iceland, is decreased. Thus the opposite pressure anomalies in the Azores and near Iceland may be related as cause and effect. R. DEC. W.

AFRICA.

ECONOMIC RESOURCES OF SOUTH ANGOLA.—Mr. H. Baum's report on the results of the expedition sent out in 1899 by the German Kolonial-Wirtschaftliches Komitee to examine the economic resources of South Angola shows that the expedition was most fruitful in results. No other party has brought back from West Africa a richer harvest of botanical data. The country traversed is one of the least known parts of Africa. The route led from Mossamedes to the Kunene, and up an eastern tributary of the latter to the upper Kubango. This stream was followed down for about 200 miles, after which the route led northeast to the Kuito and thence east to the upper Kuando, and back to the coast by a more northerly route.

Particular attention was given to the rubber-yielding plants, most prominent among which is *Carpodinus chylorrhiza*, whose roots are dug up to obtain the product. It grows in open sandy tracts. The method of preparing the caoutchouc is fully described and illustrated. The most characteristic tree of the region is the *Berlinia Baumii*, the best fibres of which are largely used for cordage, etc., while the bark serves to make boats. The fertile districts near the coasts are well adapted for cotton cultivation, though at present only sugar-cane is grown. The soil of the interior plateau is capable of growing our cereals, vegetables, and fruits. The timber supply is generally abundant, but the principal value of South Angola is its fine adaptability for cattle-raising.

MEDUSÆ IN VICTORIA NYANZA.—It will be remembered that Mr. J. E. S. Moore advanced the view that the fauna of Lake Tanganyika differs from that of the other East African lakes in alone possessing evidences of a marine origin. But *Nature* records (No. 1789) the independent discovery by British and French investigators of marine medusæ in Victoria Nyanza similar to those of Lake Tanganyika. *Nature* expresses the opinion that this fact cannot be without its effect upon the acceptance of Mr. Moore's view. Mr. Moore, however, has written a letter to that periodical (No. 1790), in which he says that this jelly-fish may have existed in Victoria Nyanza from all time, in which case we have a confirmation of his view that the ancient sea, from which the halolimnic "relic" sprang, spread much further towards the east than was at first sup-

posed. He thinks it is quite possible, however, that the medusæ have been recently transported to the Victoria Lake from Tanganyika owing to the opening up of the new trade routes.

ASIA.

THE CHINESE PUSHING NORTHWARD.—Mr. C. W. Campbell, in a paper on his Mongolian Journeys (*The Geog. Jour.*, Nov., 1903), says that as the pressure of population in Shansi and Chili increases swarms of Chinese spread beyond the Great Wall and are gradually colonizing all the mountains which form the broad staircase to the high plains of inner Mongolia. The immigrants are also encroaching on the plains. He found in 1899 that the Chinese settlers had reached a mile or so beyond Chagan-balgas, which is about ten miles north of the Great Wall. Three years later he found them ploughing the virgin turf ten miles farther north.

He says that the contrast between the plain of Chili, on which Peking stands, and the steppes of Mongolia, separated from the plain by the mountain tract, about 100 miles wide, north of Peking, is very great. The vast alluvial plain of Chili (larger than England) is sown so thickly with towns and villages that the traveller is rarely a mile away from a settlement. The plain is as flat as a floor, and is very little above sea-level. The steppes and downs of Mongolia, on the other hand, are 4,000 feet above sea-level, and have hardly as many inhabitants as there are villages in Chili. The Chinese province is a great grain field; while cultivation is almost unknown in Mongolia, except on the southern border and along a part of the Siberian frontier.

PORT ARTHUR.—Port Arthur, now prominent in public attention, stands in the southeastern extremity of the Liau-tung peninsula, just outside the southern limit of winter ice, this immunity being one of its most valuable features. The harbour is an oval inlet of the sea, two miles long from east to west and a mile from north to south; it is surrounded by hills of varying elevation, and its sole entrance is on the southern side by a narrow channel, guarded at the southwestern end by a couple of dangerous reefs and protected against bad weather by a narrow spit of rocky land, known as the Tiger's Tail. The harbour was so shallow, until it had been dredged, that no large vessel could enter; even now there are berths for but three battleships, in addition to smaller craft. For this reason the larger part of the Russian fleet has been forced to lie outside the heads of the channel or else enter the larger wet dock which lies to the east, facing the entrance to the harbour

proper. The width of the entrance from Pinnacle Rock on the west to the opposite shore is barely 350 yards. Within these heads the channel widens somewhat.

ZYBIKOV'S VISIT TO LHASSA.—Mr. Zybikov, the Buddhist and Buriat subject of Russia, who was sent to Tibet in 1899 by the St. Petersburg Geographical Society, has published in the *Izviestia* a report of his journey. Though his paper gives little information about Lhassa not found in Chandra-Das's book or the recent recital of Baza Bakchi, it contains some hitherto unpublished details. He says that Lhassa appears to be more populous than it really is, because of its large floating population of merchants and pilgrims. The number of fixed inhabitants is about 10,000, of whom nearly 6,500 are women. Throughout Tibet commercial pursuits are largely monopolized by the Chinese. Nearly all of them have Tibetan wives, who are very proud of their alliance with the Chinese, and are the intermediaries between the merchants and the petty local traffickers. The Nepalese residents are merchants or artisans, who, though Buddhists, do not marry Tibetan women, as the laws of their country prohibit these unions. On the other hand, natives of Kashmir contract marriages with women of Tibet after having previously converted them to Mohammedanism.

POLAR.

THE ANTARCTIC EXPEDITION.—Prof. Penck of Vienna has been publishing a series of popular scientific articles in the *Neue Freie Presse* on the latest Antarctic expeditions, which he believes to have accomplished very important results, though some time must elapse before the full value of the work done can be estimated. He says that while Ross looked on the Great Barrier as the wall of an extensive area of thick pack ice, the journey of Capt. Scott made it clear that it was the edge of a vast glacier, not less than 700 miles wide, which reached the sea by a great plain between the mountains of Victoria Land and Edward VII Land. If d'Urville and Wilkes were not always sure whether they saw land or merely the edge of ice masses, Drygalski has proved the existence of a completely ice-covered land in the far south, resembling in its character as to ice and snow the interior of Greenland. These voyages have made it clear that there is a seventh continent around the South Pole, how large we cannot yet tell, but probably larger than Europe. Prof. Penck thinks that Antarctica is the preferable name for this continent. He also shows that the meteorological

results are in harmony with the theory of an extensive continent. (*The Geog. Jour.*, Feb., 1904.)

SHOWING VEGETATION ON MAPS.—In his address before the Geographical Section of the British Association Meeting at Southport, Dr. W. G. Smith, of Yorkshire College, discussed the value of observing features of vegetation in geographical exploration. The vegetation of a country is, after its configuration, the most important factor in a landscape. Considerable progress has been made in representing the vegetation of countries on maps. This is done by recording the limits of distribution of the most abundant or dominant plants, such as trees. The vegetation of considerable parts of Europe and North America has been charted. The detail in simple cases shows the region of deciduous trees as distinct from that of conifers and the forest lands as contrasted with treeless areas. Maps with greater detail are now being issued in Great Britain. Vegetation charts of all parts of the earth would be a distinct gain to plant-geography.

ATMOSPHERIC PRESSURE AS A CLIMATIC FACTOR.—In *Symons's Meteorological Magazine* for February, L. Bonacina lays emphasis upon the importance of "Atmospheric Pressure as a Factor of Climate." The British Isles, for example, owe their mild climate to the fact that their winds are chiefly from warm ocean waters, but the power of these warm waters to raise the temperature of the islands depends upon the distribution of pressure. The pressure is nominally low, especially in winter, near Iceland, and the gradients thus produced naturally strengthen the prevailing westerly and southwesterly winds. When the pressure is markedly anticyclonic over the British Isles, the influence of the warm waters is largely kept out, and severe frosts may occur, even in Ireland. The configuration of the isobars is thus an important factor in the climate of western Europe. R. DEC. W.

CLIMATE AND THE COTTON-BOLL WEEVIL.—Dr. L. O. Howard considers "The Mexican Cotton-Boll Weevil" in the February *Review of Reviews*, and notes several points in which there is a climatic relation. Although this insect has its natural home in tropical America, it has greatly multiplied and spread within the limits of the United States, being one of but two or three tropical insects which have done this. The weevil first spread northward in Texas partly because carried in the cotton to the gins farther north, and partly because it flew northward, aided by the prevailing southerly winds of summer and autumn. The boll-weevil in-

creases very rapidly from spring until fall, and by the end of October the pest is at its worst; "in badly-infected regions there are weevils for every boll of cotton in the fields." It has been found that one effective way to make headway against this pest is to plant northern seed, which, being accustomed to a shorter summer, develops rapidly, so that the crop may be picked before October, *i. e.*, before the weevils are at their maximum development. Further, as the weevils like shade, the seed is now being planted in rows a good deal farther apart than formerly. These new methods, which are the result of the studies made by the Department of Agriculture, are gradually being adopted by the Texas cotton planters. R. DEC. W.

FAIRCHILD ON CHAMBERLAIN'S PLANETESIMAL HYPOTHESIS.—A paper read by Prof. Fairchild before the St. Louis meeting of the Geological Society of America is republished in a recent number of the American Geologist (XXXIII—1904, 94–116). In this paper there is not a full statement of Prof. Chamberlain's hypothesis, but an assumption that it has displaced the time-honoured nebular hypothesis. Starting with this fundamental assumption, Fairchild shows how, according to his views, the new hypothesis fits better into the explanation of a large range of geological phenomena, including such topics as the origin of hydrocarbons, metalliferous deposits, gypsum and salt deposits, mountain formation, and volcanic action, the origin of the ocean and the atmosphere, etc. The speculative conclusions which the author draws will appal most of the conservative geologists, who have been in the habit of clinging to the old. Fairchild's paper will probably not convince many of this class, but it may serve the purpose of leading them to look more carefully at Chamberlain's hypothesis, now that its application to geology is brought forward so prominently. Without taking much more space than is available here, it would be quite impossible to abstract Fairchild's paper with any degree of satisfaction, but any one who is interested in speculative philosophy will find this paper well worth study. Such reading will bring to many persons a decided shock, to see the old geology relegated to the background and the new confidently put in its place. It may be stated that most geologists will not be ready to accept this result until the planetesimal hypothesis itself is shown to have a more rational foundation than the nebular hypothesis; but in this age of startling scientific discovery and advance, one would have no right to look sceptically upon even such advanced ideas as those Fairchild has put forward. R. S. T.

BASE MAPS OF THE UNITED STATES.

Numerous Departments of the Government, as well as of the several States, have occasion to prepare small scale maps, upon which various features are shown. Those which the Government prepares are large wall maps of the whole United States for issuance by the Land Office and by the Geological Survey, for showing separate features, the former chiefly publishing land lines and grants; the latter, topographic relief. The Post Office Department publishes separate or combined State maps, showing post routes. Commissioners of Railways of the various States publish State maps showing the railways within their borders.

The United States Geological Survey has occasion, in connection with the publication of reports of its various branches, to prepare small scale maps, either of octavo or quarto size, for publication with texts, or larger maps of States or groups of States, showing topographic relief, on which are printed various symbols to indicate geologic, hydrographic, or forest conditions.

Until a year ago it was the practice of authors of the Geological Survey to prepare their own manuscript maps. As a result it became apparent in the course of time that the Survey was producing maps on widely variant scales, which were yet so near one to the other that a systematic revision of scales for the bases upon which maps were produced was necessary. To this end the Director appointed a Committee on Base Maps, representing the three producing branches of the Survey, with Mr. H. M. Wilson, geographer, in charge of the Eastern Section of Topography, as chairman; and Messrs. C. Willard Hayes, geologist, in charge of geology, and F. H. Newell, chief of the hydrographic branch, as members.

After several months of consideration this Committee recommended the subdivision of the work of preparing such maps into two heads: 1. Small scale outline base maps, to be used in textual illustration of reports. These are such maps as small octavo or quarto page maps of North America, of the United States, and of groups of States, with only such data shown as will render them available as base maps upon which to illustrate all the varieties of topics which may be under consideration by the various branches of the Survey. 2. Topographic base maps, which, in addition to culture and drainage, represent the relief of the surface by contours, including the large topographic wall map of the United States, scale of

1:2,500,000, and such topographic maps of single States or groups of States as may be needed.

The chief of the Division of Illustrations was made a custodian of all base maps, and in his division small scale outline base maps are prepared. Among such as have already been adopted are: 1. An outline map of North America, double-page quarto, 10 by 15 inches, scale 1 inch to 400 miles; 2. Outline map of the United States, same dimensions as above, scale 1 inch to 200 miles; 3. Outline double-page octavo map of the United States, dimensions 7¼ by 9⅜ inches, scale 1 inch to 275 miles. Also a series of small scale outline maps of areas of States, or groups thereof, on scales of 100 miles to an inch and multiples or even divisions thereof.

The topographic branch is charged with the preparation of large scale topographic base maps. The scales adopted for these are, for the large topographic base map of the United States, 40 miles to 1 inch, with contour interval of 1,000 feet; and for States or areas of medium size, as Utah, Kansas, etc., 12 miles to 1 inch, with contour intervals of 100 to 500 feet, according to the degree of erosion and the relative elevation. For large areas, such as Texas, Colorado, etc., the scale is 20 miles to 1 inch, with contours of 250 to 500 feet interval. For smaller areas, multiples of the above. The scales chosen in each case to be such as to permit of publishing the results on one map sheet not exceeding five feet in either direction; excepting the United States base map.

There have already been engraved and published by the Geological Survey six topographic base maps, as follows: Massachusetts–Rhode Island, scale, 1:250,000, or about 4 miles to one inch, contour interval, 100 feet; Connecticut, scale, 1:125,000, or about 2 miles to 1 inch, contour interval, 100 feet; Kansas, scale, 1:750,000, or about 11 8/10 miles to 1 inch, contour interval, 100 feet; Indian Territory, scale, 1:500,000, or about 8 miles to 1 inch, contour interval, 100 feet; Texas, including Oklahoma and part of New Mexico, 25 miles to 1 inch, contour interval, 250 feet; Utah, 12 miles to 1 inch, contour interval, 1,000 feet; Colorado, 12 miles to 1 inch, contour interval, 500 feet. In addition, the following are approaching completion, and will soon be ready for engraving: Group of Virginia–West Virginia–Maryland–Delaware, 10 miles to 1 inch, contour interval, 100 feet. Group of South Dakota–Nebraska–Kansas and parts of Wyoming and Colorado, scale 16 miles to 1 inch, contours of 250 and 500 feet interval. Some of the above, prepared prior to the adoption of the scheme of base maps scales, do not conform to the same.

The scales adopted for the standard topographic atlas sheets of the United States Geographical Survey, meaning those which are being mapped in the field from surveys made by the topographic branch and not base maps as above described, which are compilations, remain as heretofore exact multiples of 1:1,000,000, as 1:250,000, 1:125,000, and 1:62,500, or approximately 4 miles, 2 miles, and 1 mile to 1 inch, with contour intervals ranging down from 200 feet to 10 feet. For larger scale topographic maps required for special economic, mining or reclamation studies, various scales have been used in the past. Hereafter the same are to be exact multiples of 1,000 feet to 1 inch, the equivalent of which is 1:12,000; as 1:24,000, 1:36,000, and 1:48,000; or in more detailed maps, 1:6,000.

The topographic base map of the United States, better known as the 9-sheet wall map, was first published in 1890, and after careful revision was reissued under the date of 1898. The scale is 1:2,500,000, and contours are shown on it with the following intervals: 100, 500, 1,000 and 1,500 feet, above which they are 1,000 feet apart.

The Committee on Base Maps has recommended the entire redrawing and recompilation of this base map to bring up to date all the map data now available. This work is progressing rapidly, and the drafting may be completed within a few months. The engraving will doubtless take several months longer. The scale is to remain as heretofore, but the contour interval has been made uniformly 1,000 feet throughout the map. That portion of the area of the map covered by the detailed topographic surveys of the bureau, now aggregating an area of about 900,000 square miles, will be carefully revised from the topographic sheets, and engraved on a series of copper-plates. The remainder of the map surface will be compiled. It consists chiefly in the corrections of the existing copper-plates, which will be replaced from year to year as additional topographic mapping is available for incorporation into the new. It is a very difficult and important undertaking. It involves going over 1,300 atlas sheets in great detail, picking up and accentuating the 1,000 foot contour and such drainage and railway lines, county lines, etc., as will show upon the scale of the reduction. In addition to those facts heretofore shown on the existing map, the elevation of each county seat so far as obtainable will be printed under its name. The contouring will be in much greater detail, in fact, with all the detail that the scale will permit, for the areas in which topographic maps are available.

In addition to relief by 1,000-foot contours, which will be printed in brown, and drainage, which will be printed in blue, there will be printed in black such cultural features as State and county boundaries, names of county seats and important cities, the lines and names of all railways, and the outlines of Indian, forest, and other public reservations. H. M. W.

MR. E. A. REEVES'S NOTES AND SUGGESTIONS ON GEOGRAPHICAL SURVEYING AND PRACTICAL ASTRONOMY SUITED TO PRESENT REQUIREMENTS.

BY

G. W. LITTLEHALES.

In the exordium of his address, in September, 1903, before the Southport Meeting of the British Association for the Advance of Science, Mr. Reeves has pointed out that the era of general geographical exploration has practically closed, and that the era of mensurational geography has set in throughout nearly the whole world. Except in the polar regions there are no longer any vast areas of the earth into which an explorer may penetrate and emerge with the glory of a Livingstone or a Stanley. Men capable of giving a good account of what they observe have visited nearly every part of the earth's surface and brought back enough to provide for the first rude approximation to the mapping of the world. The needs of the present time require that travellers who aim to contribute toward an advancement of geographical knowledge should be equipped to record their observations upon a scientific basis. In order that conjecture may give place to measurement, Mr. Reeves rightfully advocates that the explorer should expand over the region to be traversed a system of rapid triangulation, starting from a measured base-line connected with some point where latitude and longitude have been fixed by previous operations or by his own determination, and should delineate the surface forms and other characteristics, in relation to the stations of the triangulations, by the use of one of the more simple forms of plane-table.

For the construction of the plane-table sheets Mr. Reeves

recommends the "Survey of India" projection, which is based upon the principle of treating a certain limited portion of the surface of the globe, such as a degree-quadrangle, as if the globular contour had been planed off flat within the chosen limits. Tables for facilitating the construction of this projection are to be found in the Auxiliary Tables of the Survey of India, but perhaps the American explorer might prefer the polyconic projection, which is in use by all the geographical surveys of the United States, and with reference to which ready means of construction may be found in the Projection Tables of the United States Hydrographic Office and in many other equally well-known American works.

Great as is the importance that the modern geographical explorer should be a draftsman capable of generalizing the physical features of a country, so as to represent the leading characteristics with their proper prominence and the details with appropriate subordination, and that he should have a practical knowledge of surveying and astronomy, of even greater importance is it that his instrumental equipment should be reliable within the limits imposed by portability and ease of manipulation. As a result of the author's own experience and investigations, while recognizing that there are occasions when the sextant is the only instrument that can be taken for the measurement of angles, he assigns to the first place among the explorer's mensurational instruments the 6-inch transit theodolite reading with micrometers on both vertical and horizontal circles to 5″, and by interpolation to 2″, or failing this, by verniers to 10″. With such an instrument a close approximation to the latitude of a station may be obtained from circum-meridian altitudes of stars, and triangulation may be carried on throughout a large extent of country with such a degree of precision that no appreciable error will result when the work is projected on a scale of $\frac{1}{250000}$, or nearly one-fourth of an inch to the mile. Mr. Reeves has instructively described how, with such a triangulation executed, a small plane-table, measuring $1\frac{1}{2}$ x 2 feet and perhaps smaller, fitted with a telescopic-alidade by which vertical angles as well as horizontal directions are taken, may be employed for the rapid and reliable delineation of large extents of territory, in which the surface characteristics will appear in their proper relative locations and with their forms described in roughly controlled contour lines. The assignment of such a piece of work to its exact place on the face of the earth must, of course, depend upon the determination of the latitude and longitude of some point within its limits, but it is not essential to the usefulness of the survey that this be done at the time

the survey is made, for if it be neglected then, obviously the work will remain as a unit to be assigned to its proper geographical place at whatever time in the future a final determination of the geographical position may be made.

The paper under review sets forth the best ordinary methods that would be available to the explorer for finding latitude and longitude, and does not fail to point out that under the vicissitudes of travel all watches and chronometers that may be transported for time are liable to such uncertainties of rate that all but relative determinations of longitude are extremely unreliable. Among the so-called absolute methods that are mentioned as available for determining longitude, or Greenwich Mean Time, the photographic method devised by Captain E. H. Hills, R.E. (see "Determination of Terrestrial Longitudes by Photography" in the Monthly Notices, Royal Astronomical Society, London, January, 1893), might have been included, because superior results may be attained by its employment in localities isolated from all agencies usually employed in the determination of time.

NEW MAPS.

AMERICA.

NORTH AMERICA.—Karte von Nord-Amerika. Scale, 1:10,000,000, or 157.8 statute miles to an inch. 33 x 27 in. From the Sohr-Berghaus Handatlas. By Dr. A. Bludau and Otto Herkt. Carl Flemming, Glogau. Presented by Lemcke & Buechner, New York City. (Price, 4 marks.)

This may be the first detailed map of North America showing the Republic of Panama. In spite of its small scale the map presents effectively an enormous amount of information. All that is known of the distribution of gold in Alaska and the Yukon Province of Canada is shown on this map. Similar information cannot be found on comparatively large-scale maps of Alaska published in the United States within the past few months; nor do we often see, as in this work, the lighthouse system of our Great Lakes depicted on a map embracing the continent. We know of no other map of North America which presents so much geographical, ethnological, and economic information. The names of the Indian tribes and other aborigines are printed in red, making it easy to find their habitats. The oceanographic information, as relates to the conformation of the sea floor and to cable lines and ship routes, is particularly full. The Arctic islands discovered by Sverdrup are shown, but Peary's latest work is north of the map's limit. There are 11 inset maps.

MINNESOTA.—Atlas of the Vermilion Iron-bearing District. By J. Morgan Clements. United States Geological Survey. Washington, D. C., 1903.

This Atlas accompanies monograph XLV on the Vermilion iron ore district in northeastern Minnesota. It contains 23 map sheets, of which 7 are topographic,

and 7 geologic, all on a scale of 1:62,500, or nearly 1 statute mile to an inch. No attempt is made to show topography outside the areas surveyed by the United States topographers. The entire district is covered with glacial drift and on this account it has been impossible in some places to determine the underlying formations. Such areas are left uncoloured. The last 9 sheets are large-scale detail maps of districts that are of special structural interest or contain iron-bearing formations in their best development.

UNITED STATES.—Eastern Piedmont Plateau. Compiled by Edward B. Mathews. *American Journal of Science*, Plate X, Feb., 1904.

A sketch map showing the correlation of crystalline rocks in the Piedmont Plateau, lying between the Blue Ridge on the west and the Coastal Plain on the east between New York and Washington.

UNITED STATES.—Geologic Atlas of the United States. No. 93. Elkland-Tioga Folio, Pennsylvania. Includes the Elkland and Tioga quadrangles. The Tioga quadrangle extends between longitudes 77° and 77° 15′ and the Elkland quadrangle between 77° 15′ and 77° 30′. Both are between latitudes 42° and 41° 45′. Area of the two quadrangles, 222.5 square miles. They belong to the region of gently-folded rocks and plateau-like topography that characterize the division of the Appalachian province known as the Allegheny Plateau. Most of the area is divided by the Tioga River and its tributaries. The topography is chiefly that of a plateau which has been cut into by streams until the valley bottoms lie far below the general level of the uplands (dissected plateau). The geological formations are glacial deposits, not thick except in valleys and parts of moraines, and sedimentary rocks (Devonian and Carboniferous), which are exposed by the deep cutting of the streams and the moderate tilting of the beds to a thickness of about 3,500 feet. Flag stone is the chief mineral resource. The best soils are largely composed of the shales and sandstone of the Chemung formation and the flood plain alluvium.

BOLIVIA.—Sketch map of Caupolican and adjoining portions of northern Bolivia. Scale, 1:750,000, or 11.84 statute miles to an inch. Compiled from the surveys of G. N. Watney, J. W. Evans, and others. *The Geographical Journal*, London, Dec., 1903.

This survey supplies considerable material for the improvement of the atlases, as it covers a part of the region watered by the upper Beni and its western tributaries, of which little was known.

PATAGONIA.—Sketch Map of Patagonia. Scale, 1:5,000,000, or 78.9 statute miles to an inch. *The Geographical Journal*, February, 1894.

Showing the fixed boundary between Argentina and Chile and the route taken by the Boundary Commission on their visit to Patagonia.

EUROPE.

GERMANY.—Isochronenkarten der Provinz Brandenburg. Scale, 1:750,000, or 11.84 statute miles to an inch. By Dr. W. Schjerning. *Zeitschrift* der Gesellschaft für Erdkunde zu Berlin. No. 9, 1903.

Four isochronic maps colored to show the average time to travel by rail, postroad, or on foot from Berlin to all parts of the province. The maps are for the years 1819, 1851, 1875, and 1899. The isochronic lines connect all points that are reached from Berlin, in the same time, by the various modes of conveyance. Such maps are of comparatively recent origin, and not many have been produced. The first was

that made by Francis Galton in 1881, when, with London as a central point, he showed on a small map the time required to reach various parts of the world, the isochronic lines marking ten-day intervals.

GREAT BRITAIN.—The Industrial Development of the Forth Valley. Scale, 1:63,360, or one statute mile to an inch. By H. M. Cadell. *Scottish Geographical Magazine*, Edinburgh, February, 1904.

Showing in colors reclaimed lands, lands that may be reclaimed, lines of wall and embankment required for this work, and the mud flats along the Firth of Forth.

GREAT BRITAIN.—Upper Estuary of the Forth. Scale, 1:126,720, or 2 statute miles to an inch. *Scottish Geographical Magazine.* February, 1904.

Illustrating a paper by H. M. Cadell on the industrial development of the Forth Valley.

RUSSIA.—Newa Bucht (Cronstadt to St. Petersburg). Scale, 1:50,000, or 0.7 statute miles to an inch. Corrected to April, 1903. Hydrographic Office, Berlin.

One of the superior charts issued by the German Government.

ASIA.

ASIA.—Orographical Map of Asia. Scale, 1:30,000,000, or 474 statute miles to an inch. By Prince Kropotkin. *The Geographical Journal*, February, 1904.

EASTERN ASIA.—Orographical Map of Eastern Siberia and parts of Mongolia and Manchuria. By Prince Kropotkin. *The Geographical Journal*, February, 1904.

These maps illustrate an article by Prince Kropotkin on the orography of Asia, a subject to which he has given much attention for years. They are practically the same maps published in Russia in 1875 by the author, and representing his conclusions, especially as to the orographic features of Siberia. His representation of the topography of Asia was accepted by Dr. Petermann, of Gotha, and has appeared since 1875 in all the editions of the Stieler's Atlas. He shows the plateau of Tibet, Central Asia, and Siberia as belonging to the same system of massive upheavals. Prince Kropotkin says:

> There are two distinct terraces in these plateaux: One upper in the west, and one lower in the east, while several still higher terraces rise in the south, in Tibet. The mountain ranges are entirely subordinated to the plateaux, and run chiefly from the southwest to the northeast; but they are crossed also by a number of ranges running nearly perpendicular to the former, that is toward the northwest, or rather west-northwest.

SIBERIA.—Geological Map of the Shores of Lake Baikal. Scale, 1:3,500,000, or 55.23 statute miles to an inch. *The Geographical Journal*, February, 1904.

A sketch map to illustrate the paper on The Orography of Asia by Prince Kropotkin. The map indicates the eight geological formations shown by Chersky as forming the shores of the lake. The soundings are after Drizhenko.

CHINA.—Plan of Hankow. Scale, 1 centimetre = 250 yards. *Reports and Returns of Trade for 1902.* Shanghai, 1903.

Colored to show the five foreign concessions along the Yangtse. Besides the plan of the city the information includes the position of the hulks and pontoons along the water front used in the freight movement, the famous iron works and arsenal across the Han, the cotton mills on the south side of the Yangtse, and diagrams showing climatic conditions, and the rise and fall of water in the Yangtse for 1902.

AFRICA.

EAST AFRICA.—Der Oberlauf des Schire. Scale, 3.5 statute miles to an inch. Surveyed by Captain M. Prager. *Deutsche Rundschau für Geographie und Statistik.* 1904, A. Hartleben, Vienna.

This is a detailed survey of the Shire River from the German and English stations near Myimbi to the entrance of the river into Lake Nyasa, about fifty-eight miles further north. It is a welcome addition to the maps of the Shire. It shows a complete line of soundings along the whole upper course of the river taken midway between the banks, together with the villages and other cultural features and characteristics of the vegetation for a considerable distance back from either shore.

WESTERN AFRICA.—Sketch map of Northern Nigeria. Scale, 1:3,000,000, or 47.3 statute miles to an inch. *The Geographical Journal,* London, Jan., 1904.

The map illustrates a paper read by Sir F. D. Lugard, High Commissioner of Northern Nigeria. It shows the boundaries of the sixteen provinces into which the country has been divided and incorporates a considerable part of the new map material collected by civil and military officers of the Protectorate. What is most needed, says the High Commissioner, is that the exact position of a certain number of important towns be fixed so that with the aid of these determinations other detail may be satisfactorily filled in. Telegraph routes are shown.

OCEANIA.

NEW GUINEA.—Map of British New Guinea. Scale, 1:260,000, or 4 statute miles to an inch. From the latest astronomical observations, surveys, and explorations. By Sir William McGregor and officers of the British New Guinea Government. Brisbane, Queensland, 1899.

This map, in 13 sheets, including a key map, was brought out under the superintendence of the Surveyor General of Queensland. It embodies all the extensive surveys and astronomical determinations of Sir William McGregor, adds considerably to our previous knowledge of this part of New Guinea, and emphasizes by large white spaces the surveys still required. The map includes excellent insets of Port Moresby (1 mile to an inch), and Samarai.

POLAR.

ANTARCTIC.—The Track of the Scotia, 1903. Scale of latitude, 1:14,000,000, or about 230 statute miles to an inch. *Scottish Geographical Magazine,* Edinburgh, February, 1904.

This is the authoritative map of the voyage, in 1903, of the Scottish expedition on the *Scotia,* from Falkland Islands to the South Orkneys and thence along the pack ice to 70° 25′ S., 17° 00′ W., in Weddell Sea, and between the furthest southern tracks of Weddell and Ross. Of this cruise of over 6,000 miles in Antarctic waters, 4,400 miles were in entirely unexplored seas.

ATLASES.

STIELER'S HAND-ATLAS.—Neue neunte Lieferungs-Ausgabe. 100 Karten in Kupferstich. Lieferungen 19–28. Gotha, Justus Perthes. Price, 60 pf. for each part, containing 2 map sheets.

The five sheets (26–30) comprising the late cartographer Vogel's four-sheet map of France and his summary map of the Republic, have been revised by H. Kehnert for the present edition. They show in a striking manner the increased legibility resulting from the mechanical processes now used by this house over the former printings of this famous map. The purple, instead of the red outlining of the country, is

more pleasing to the eye. The place-names on the *übersicht* map have been considerably augmented, without overcrowding. Sheets 21–25, Vogel's map of Italy, have been revised by O. Koffmahn, who also had charge of 31 (Spanien und Portugal) and 34 and 35 (Pyrenäische Halbinsel). These parts thus complete, for the new edition, the maps of France, Italy, and the Spanish Peninsula. In the map of Austria-Hungary (No. 16) the plains of Hungary and Wallachia are sharply contrasted with the rough areas around them. Four sheets (44–47) of the new map of Russia, by H. Kehnert and H. Habenicht, are on a scale of 1:3,700,000, or 58.3 statute miles to an inch, the same scale used in this atlas for the map of the United States. The northwestern sheet (44), extending to the Atlantic coast, shows finely the Norwegian fiords between North Cape and Trondhjem and on the largest scale ever given to them in this atlas. This map of Russia is a work of much importance, as it is the best that has yet been accessible to the public. Another new map is Ireland (39), with English nomenclature for the surrounding waters, as "Irish Sea" for "Irische See." Three inset maps show London and Dublin and its environs, and the manufacturing districts of Lancashire and York.

THE HANDY WORLD ATLAS AND GAZETTEER.—Frederick Warne & Co., New York City. No date. Price, 40c. net.

This is one of the best pocket atlases. It contains 120 pages of small maps, made by Bartholomew, of Edinburgh. Twenty-six pages are given to the United Kingdom and only six to the United States; but the position of most places is shown, also the distribution of the leading commercial products, and the small volume is well packed with information. The Gazetteer gives the situation and chief characteristic of several thousands of geographical names.

THE HIGHEST MOUNTAIN ASCENT.

In the *Scottish Geographical Magazine* for January is an article, mentioned in the BULLETIN of the *American Geographical Society* for January, stating that in 1903 Dr. Workman reached the altitude of 23,399 feet on a peak of 24,486 feet in the Himálayas, "which gives him the world mountaineering record for men, the greatest before attained being the summit of Aconcagua, 23,083 feet, the highest of the Andes."

It seems well to remind geographers that Mr. W. W. Graham claims to have reached in 1883 the lower summit of Kabru, 23,700 feet,* in the Sikhim Himálayas. His companions were Herr Emil

* A letter written by Mr. Graham from Tumlong, Sikhim, Nov. 11th, 1883, to the Editor of the *Alpine Journal* and quoted in the *Proceedings* of the Royal Geographical Society, Vol. VI, 1884, pp. 68–70, tells of four ascents accomplished by himself and his two companions, in these words:

"We then had fair success, climbing four peaks, all pretty high. The first two are unnamed; one, the most western of the range, is 19,300 or 19,400. The next, south of Kinchin, is about 20,000 feet, but the measurement is not quite certain. The third, Gubour, is in the Pundim range, and is 21,300 feet, whilst last, but not least, came Kabru itself, 24,015."—(EDITOR BULLETIN.)

Boss, landlord of the Bär at Grindelwald and captain in the Swiss army, and the first-class guide Ulrich Kauffmann. A letter from Mr. Graham to Mr. W. A. B. Coolidge was printed in the *Alpine Journal*, February, 1884, Vol. XI, pages 402–407. Then Mr. Graham published a long, detailed account of his journey, in the *Alpine Journal*, August, 1884, Vol. XII, pages 25–52. Following this, pages 52–60, is a paper by Mr. Douglas W. Freshfield, principally based on the statement of Captain Emil Boss. Then, in the *Alpine Journal*, November, 1884, Vol. XII, pages 99–108, Mr. Freshfield, who, like Mr. Coolidge, thoroughly believed in the accuracy of Mr. Graham's observations, published another article discussing anew the ascent of Kabru.

A good deal of doubt was cast on the reality of Mr. Graham's ascent at the time, principally by certain Anglo–Indian travellers, who displayed a bitter jealousy of Mr. Graham's success and a lamentable ignorance of mountaineering. Some of them interviewed some of the natives of the Sikhim valleys, who, as Mr. Freshfield pointed out, could not have known anything of the matter, and based their attacks on the statements of these irresponsible natives. As to the value of their charges, the following quotations may be instanced. "The Alpine climbers have also credited themselves with the ascent of Pandim, a height of 22,018 feet." On the contrary, Mr. Graham never claimed to have ascended Pandim, which he described as a peak of extraordinary difficulty. Another writer made the following remarkable statement: "Mr. Roberts has taken angles with a theodolite at Kabur, and he says, most decisively, that no practicable ascent could be found from this point to Kabru; and that no amount of skill and experience can avoid the almost certain consequences of an attempt to clamber over sharp ledges of rock, and of the yielding of the snow-coating that covers over a concealed crevasse." In regard to the first part of this sentence, it happens that Mr. Graham also stated that Kabru was inaccessible from the south, in which direction Kabur lies, and he made his ascent from the east. The last part of the sentence shows that the writer was totally ignorant of the mountain-climber's art. For what are sharp ledges of rock, and what consequences would follow an attempt to clamber over them? And to quote Mr. Freshfield: "Had we not long ago learnt how to 'avoid the consequences' of concealed crevasses the whole Alpine Club would by this time be descending the Alps at the rate of a few inches a day, and in the condition of frozen meat."

Mr. Graham's perfectly straightforward narrative does not ap-

pear to have been disproved in the least as yet, and therefore it seems strange that writers usually ignore an ascent in which possibly the highest altitude ever reached by man was attained. It would certainly be most interesting to mountaineers if some one would point out why Mr. Graham's claims to the world's mountaineering record are invalid. EDWIN SWIFT BALCH.

BOOK NOTICES.

Danish Life in Town and Country. By Jessie Brochner. 266 pp. Illustrations and index. G. P. Putnam's Sons, New York, 1903. (Price, $1.20 net.)

This is the latest volume in the notable series of books now appearing under the title of "Our European Neighbors." Written with ability, information, and humour, it is a faithful picture of the social life, the politics, education, amusements, and other aspects of the Danish people. Though the Danes are off the larger routes of world-travel, the reader gains the impression that they are largely self-sufficient, and, with their own advanced arts and letters, industries, and standards, do not feel the need of closer contact with the rest of Europe. The author has written with the knowledge and sympathy that come only from long residence among and close intimacy with a people. Of course, the book contains a very readable account of the remarkable results of agricultural co-operation in Denmark. Mrs. Brochner says that co-operative dairying is directly responsible for an increase in the value of Danish butter exports from about $5,000,000 in 1882, the date of the formation of the first co-operative dairy in Denmark, to over $29,000,000 in 1900.

Tirol und Vorarlberg. By Prof. Dr. Max Haushofer. pp. 206. With 202 illustrations, a map and index. (Second Edition.) Velhagen & Klasing, Bielefeld and Leipzig, 1903. (Price, 4 m.)

This is one of the *Land und Leute* monographs published by Velhagen & Klasing, in which comparatively small regions are described with the accuracy and thoroughness which German geographers bring to their work, the whole being illustrated by superb photographs. A brief bibliography of the best books on the Tirol is appended. Pen and pencil were well employed, and with much success, in this effort to depict the glories of the Austrian Alps.

A Pleasure-Book of Grindelwald. By Daniel P. Rhodes. pp. 235, sixty-one half tones and a map. The Macmillan Company, New York, 1903.

This is a book of the Bernese Oberland, at the foot of whose towering snow mountains lies the Valley of Grindelwald. It is a book for holiday travellers, and, without a bit of the guide-book air, answers hundreds of interesting questions that a bright tourist would be likely to ask about the mountains, chalets, villages, glaciers, guides, and many other things. The famous climbs around the valley are very familiar to Mr. Rhodes, and he tells of the incidents that some of them provide, and of the views from the summits, also of quiet and delightful places among the mountains where the railroad has not yet brought its noise and crowds. The book is worthy of a full index, but has none.

Russland in Zahlen. Statistics collated by Gregor Iw. Kupczanko. pp. 148, and a railroad map. Otto Wigand, Leipzig, 1902.

A compilation of the latest Russian statistics taken from official sources, and intended as a reference book for those who are particularly interested in Russian affairs and progress. For all who read German and have occasion to refer to fuller statistics of Russia than are published in English this little book will be very useful.

Handbook of Jamaica for 1903. pp. 522, and index. Kingston, 1903.

The twenty-third annual appearance of this publication, which embraces much historical, statistical, and general information concerning the island.

Aus Deutsch-Brasilien. Bilder aus dem Leben der Deutschen im Staate Rio Grande do Sul. By Alfred Funke. pp. 285, many half-tone illustrations and one map. B. G. Teubner, Leipzig, 1902.

This book pleasantly describes the life and surroundings of the German settlers in southeastern Brazil. It is largely made up of talks with the inhabitants, including blacks and other natives, and gives many of the author's personal experiences. The book catches the atmosphere of the region, but skims lightly over the surface, attempting no serious geographical or economic treatment of the subject that might give some scientific value to the work. It is worth reading for the light it throws on this neglected region and these colonists; but so little has been written about them and their new home that a serious and thorough book on the subject would be welcome.

Guide Annuel de Madagascar et Dépendances. Printed by the Government. Antananarivo, 1903.

It is difficult for the reader to realize, with this book before him, containing 846 pages of information about Madagascar, "for the use of colonists, planters, merchants, manufacturers, officials and travellers," that it is only about nine years since the French army entered Madagascar. The progress made since the restoration of peace is illustrated to some extent by the annual appearance of this reference book, which is an encyclopædia of information about the island and its present condition. The volume includes twenty-six sketch maps, tracing what is known of the geology of the island, the distribution of forests, colonists, post offices, and telegraph lines, the canal and land routes, as well as maps of the provinces on a larger scale. There are also a number of photogravures showing towns, coffee plantations, meat-preserving works, and other industrial plants. The letterpress includes an excellent geographical description of the island and full information for colonists, who, if they read with care the part of the volume especially intended for them, will have no illusions as to the prospects in Madagascar. They are told that the pioneers who help to develop that country will have to work very hard, that there are many disappointments, and that intelligence, temperance, courage, and industry are required. Climatology, commerce, industrial enterprises, and all the leading interests of the island are described.

Nyasaland Under the Foreign Office. By H. L. Duff. 422 pp., 17 illustrations, map and index. George Bell & Sons, London, 1903.

Mr. Duff was a member for several years of the British Central Africa Administration, his duties calling him as far north as Deep Bay, on Lake Nyasa, though most of his time was spent in the highlands south of the lake. His book, prepared largely among the scenes described, is a well-arranged and admirably-written account of the Protectorate, the methods and results of its government, the qualities and industries of its native inhabitants, the flora and fauna, and many other aspects of the region. It gives in convenient compass all that is needed to acquaint the reader with past and existing conditions in this part of Africa. Peace has spread over the land in which almost incessant warfare was waged before the tribal organizations were replaced by a humane Government, strong enough to enforce its laws and suppress disorder. Larger books

have been written on Nyasaland, but none gives a more vivid impression than this work of the country or of the transformation in progress there.

Around the Caribbean and Across Panama. By C. Nicholas. Pp. 373, with maps and half tones. H. M. Caldwell Company, Boston and New York.

Dr. Nicholas visited nearly all the lands around the Caribbean, exploring the gold regions, timber lands, rubber forests, and other resources of the tropics in the interest of an American company. He tramped, canoed, and rode along the rivers; through dense jungles, over high mountains and across the savannahs, and especially made the acquaintance of all phases of wild life from Honduras to Bogotá. His very readable book is not so much a description of these countries as the story of incidents and adventures of the road. He says the resources are enormous, and, with the beginning of work on the Panama Canal, a great impetus will be given to all this region. The narrative of his long wanderings will certainly give to those expecting to visit the Caribbean lands a vivid idea in many respects of the conditions and circumstances they will meet. Many of the illustrations are of unusual excellence. The account of the author's visit to the little-known Goajira Indians of Columbia is, from the standpoint of the geographer, the most valuable feature of the book.

Australia and Oceanica. Selected by F. D. Herbertson and edited by A. J. Herbertson. Pp. 221, half-tone illustrations, index and bibliography. Adam & Charles Black, London, 1903. (*Price 2s. 6d.*)

This is the sixth little volume in the series of "Descriptive Geographies from Original Sources." Each volume is devoted to typical aspects of a continent; its life, phenomena, and industrial phases are depicted by writers who describe what they themselves have observed. This is geography at first hand. The compilers of the book have, on the whole, critically selected its contents, and so well covered all typical and conspicuous features of the regions treated that it is really a compendium of many things that are best worth remembering of their geography and people. The book is more entertaining and authoritative than most geographical readers; at the same time it may be questioned if it might not have been well to exclude some of the material as not of a sufficiently high standard.

Handbook of Commercial Geography. By George G. Chisholm. Fourth Edition. Pp. 639, 37 maps, 6 diagrams, and an index. Longmans, Green & Co., New York, 1904.

The first edition of this standard work was published in 1889. The present book is about one-fourth larger than the first edition, the main text having been considerably expanded and the footnotes being much more numerous. The work has been brought up to date, and it is undoubtedly the best handbook on the subject published in our language. Teachers of commercial geography will find Mr. Chisholm's work especially convenient and helpful for reference, as it naturally gives fuller treatment to many topics than the text-books, and thus provides much explanatory and illustrative material. More maps and diagrams are printed than in the earlier editions, but on the whole they do not so well represent the geography of commerce and industry as the maps in some text-books, or those in the German school atlases of commercial geography.

Commercial Geography of the World outside the British Isles. By A. J. Herbertson. pp. 268, and index. W. & R. Chambers, Limited, London and Edinburgh, 1903.

This is a continuation of the "*Commercial Geography of the British Isles,*" by the same author, published in 1899. The book is too small to admit of any interpretation or even record of many geographical facts relating to the economic position of minor countries. The leading nations, however, receive fuller treatment, though the need for compression to get all the world outside of the British islands within the compass of 268 short pages is everywhere manifest. The most pertinent facts are simply and strongly presented, and in the hands of a well-equipped teacher the book should be very useful in elementary classes. Such a sentence as the following does not quite represent the present position:

> The United States is only at the beginning of its career as a manufacturing nation. Its enormous command of raw material, of fuels, such as coal and oil, and its great and growing population, fit it to take a leading place in the future.

The production of manufactures in the United States was nearly double that of Great Britain in the last years of the nineteenth century; and since 1900 this country has led all nations in exports of manufactures.

New Physical Geography, by Ralph S. Tarr. Pp. xiii and 457. The Macmillan Company, New York, 1904. (Price, $1.00.)

The progress that has been made in secondary school geography

teaching during the last decade is clearly evidenced by the contrast between Professor Tarr's New Physical Geography and his Elementary Physical Geography, published in 1895. The latter book was distinctly "new" when it first appeared, and has had an extremely important influence in making possible such books as the author's recent volume, and the equally valuable texts by Davis, Dryer, and Gilbert and Brigham.

While the earlier volume was informational largely, and merely suggested laboratory and field work as a possible and valuable adjunct to text-book work, the recent volume is distinctly disciplinary in its order of presentation, and makes a strong emphasis of laboratory work. The contrast can perhaps best be shown by a detailed consideration of the way a topic like mountains is treated in the two books.

In the earlier book the larger attention is devoted to a description of mountain characteristics, in which the common mountain terms, like range, pass, system, etc., are introduced. The other topics considered are the Origin, Sculpturing, Drainage, and Destruction of Mountains. There is no attempt at a classification of mountains, and the implication from text and illustrations is that all mountains are folded mountains.

In the recent volume the author has given us a good, clear, and scientific account of mountains, in which each section deals with one topic. The reader cannot easily gain erroneous notions from the text, and must gain some training in scientific thinking. The chapter includes the following topics—The Mountain Rocks, Names Applied to Parts of Mountains, Climate of Mountains, Denudation of Mountains, Resemblance between Mountains and High Plateaux, Distribution of Mountains, Cause of Mountains, Types of Mountains, Life History of Mountains, The Drainage of Mountains, Settlement of Mountains, Mountains as Barriers, Mountains as Summer Resorts, Mountains as Timber Resources, Mineral Wealth of Mountains.

Here we have an adequate treatment of the physical and the life side in the proper causal order, and also a simple classification of mountains such as can be used in any good secondary school course. This chapter is a good illustration of the general plan and excellence of the book, so far as the content and manner of treatment are concerned. Apart from the subject-matter side, the book has many points of excellence. Mention should especially be made of the numerous black-and-white diagrams, and of the many small maps. Some of the latter are poorly reproduced, but otherwise

the illustrations are far superior to any in the author's earlier volumes. It is unfortunate, however, that a good book must be marred by so many illustrations without any natural scale. *Globigerinas* seemingly larger than a *laccolith* are at least an anomaly.

Each chapter in the book is followed by a series of review suggestions (useless to any but the worst teacher) and by a brief and well-selected list of reference books. It is a pleasure to see the usually unnecessary topics of minerals and rocks relegated to an appendix which need not be used by every teacher. The appendix also includes suggestions to teachers in reference to many topics, usually sources of difficulty. The most valuable chapter, however, is that devoted to laboratory equipment. This chapter contains detailed suggestions as to the choice of maps, as to the manner of keeping equipment, and as to the use of maps. It should be of great help to teachers who have before them the difficult task of persuading School Boards that laboratory work is necessary and an adequate equipment indispensable.

The book as a whole is interesting, usable, and attractive. It should take its place among the four or five best books in the field, and be of service in helping to improve secondary school geography. It distances by a good margin any previous volume by the author. R. E. D.

Round Kangchenjunga. A Narrative of Mountain Travel and Exploration by Douglas W. Freshfield. London, Edward Arnold, 1903. Large 8vo, pages xii, 373; 41 half-tone illustrations, 1 panorama, 3 maps, and appendices.

Mr. Freshfield's book is a fine example of how mountaineering becomes ancillary to geographical science. It presents with vividness of detail the topography, glacial and scenic features, and, incidentally, the geology, of a limited area, in a region that appeals to our imagination as the culmination of mountain grandeur.

His expedition left Darjiling on September 5, 1899, and returned some weeks later, having "ascended and descended 75,000 feet, or 14 vertical miles up, and as many down." In the remoter districts they "had been 24 days without meeting any human beings, and 20 days without seeing a tree." Among the seven Europeans of the party there were, beside the leader, Professor Edmund Garwood, the Signori V. and E. Sella, and A. Maquignaz, an Italian guide—names familiar to Alpinists.

Yet, despite this notable aggregate of vertical miles, the expe-

dition did not prove the success that seemed guaranteed by the expert ability of the party. Nature seemed not yet prepared to admit man to those inviolate sanctuaries, for a storm of extraordinary severity, that spread ruin and death through the foothill country (27 inches of rainfall at Darjiling in 38 hours!) swept over the range on the evening of their arrival at a high camp (15,200 feet), near the northern base of Kangchenjunga. Snow a metre in depth surrounded them, and the snow-line was lowered 4,000 feet, rendering all climbing of high peaks impossible for that season.

A change of programme was imperative. Even the hoped-for crossing of the range, and into Nepal by an untried pass (20,000 feet), immediately north of the great peak, had to be abandoned, and the passage of the Jonsong La, of about the same altitude, but several miles farther north, had to be substituted for it. This pass had probably been made in 1884, by the native surveyor (pundit) Rinsing, who was also a member of the present party. This less exciting journey was, however, under existing conditions, no easy matter; nor would it lack results for geographic science. The native eye lacks observance for many things that interest the trained European. Rinsing's failure to recognize the pass when reached somewhat beclouds his title to having made it rather than some lower one, and only inadequate data existed for the region lying between the head of the great Zemu glacier, northeast of Kangchenjunga and the Kangbachen valley, west of the range visited by Sir Joseph D. Hooker in 1849. That lacuna is now filled.

Mr. Freshfield does not magnify the mountaineering difficulties of this high tour; indeed, he says, "there were no difficulties at all from the point of view of an Alpine guide or climber." Five camps were made on the ice or the moraine after their start; but, despite the heavy going, it seems clear that the time could have been practically halved with Swiss porters. It is again the familiar story of the inadequacy and undiscipline of coolies, mitigated only by evidences of unusual solicitude for their comfort and safety. While in general optimistic as regards the final conquest of even the tallest Himalayan giant, Mr. Freshfield believes that such victories are likely to be postponed until a more reliable way of transporting supplies to high camps can be reached. The book cannot but prove fascinating even to those not bitten with the love of mountain-climbing. The almost magical transition from the tropical forest of the Teesta valley to dazzling solitudes never before beheld by human eye, through zones of altitude that parallel a journey from Equator to Arctic Circle, gives ample scope to the author's

power as a word-painter. Certain passages are eloquent, as when he stands before queenly Siniolchum, "the most superb triumph of mountain architecture." It should be read with Sella's wonderful telephotograph before one, for no human words can reproduce it. Happily, the party had in its number the prince of photographers, whose reproductions of mountain majesties have been the delight of our generation, and the matter proved superb for his art. The results profusely illustrate the work. Probably the most wonderful product of the camera in high altitude is the panorama of the Kangchenjunga group from Kangchen glacier, at an elevation of 17,000 feet, reproduced from five consecutive negatives, with slight reduction.

The elaborate "sketch-map" in three colours on a scale of 1:125,000, prepared by Mr. Garwood, is a beautiful piece of work. Studied especially in connection with the numerous views, it gives most satisfactory information as to the topography of the Kangchenjunga range and its vast system of glaciers. These cover, approximately, 327 square miles, as against 193 for the Bernese Oberland.

A most interesting contrast is drawn by Mr. Freshfield between the surface conditions of Himalayan and Swiss glaciers. Here, instead of crevasses, at least in the trunk glaciers, one finds an "irregular labyrinth of heights and hollows." Crevasses they hardly met with, though they saw them in plenty on some of the secondary glaciers passed on either hand. There were no *moulins*; the drainage of the glacier seemed to be carried along its surface. Perhaps the most interesting phenomenon is one that suggests the *nieves penitentes* of the high Andes, recently discussed in the *Zeitschrift des deutschen und österreichischen Alpenvereins, Band xxxiii.* Where in the Alps there would have been an icefall, here they "were confronted by a multitude of ice pinnacles, best compared to the earth pillars found where friable slopes are subjected to severe atmospheric denudation. Tier above tier against the mountain side rose the frozen cones and spurs, a ghostly crowd illuminated by the sun's rays." The author accounts for these unusual conditions by the greater variations of the temperature to which the ice is here exposed," to fiercer sun heat, and, below a certain level, to heavier rainfall, which renders it more plastic than in the Alps.

Added testimony is furnished to prove "mountain sickness" a purely personal matter, as much so as seasickness. Those who suffered from it were most affected at 15,000–16,000 feet, with no increase of symptoms on rising to 20,000 feet. Mr. Dover, one

of the party, "had a constitution on which the only effect of altitude of 20,000 feet was to increase his appetite, and consequently his weight." A Gurkha pioneer (of whom they had six, beside some fifty coolies) ran uphill at the Jonsong La itself. Mr. Freshfield was able to walk at the end of the tour "from 13,000 to 16,000 feet without a halt." Naturally, he reprehends the aspersions on Mr. Graham's veracity or competence as to his reaching the summit of Kabru (24,000 feet), called in question principally by his having reported no evil effects of rarity of the air. So far as this bugbear is concerned, Mr. Freshfield does not hesitate to prophesy that Kangchenjunga and its loftier rivals will one day have a flag on their summits.

In one extended appendix Professor Garwood discusses the geological structure and physical features of Sikhim, accompanied by a map representing material for a geological map of the country and covering a somewhat larger area than the one already mentioned. Other interesting appendices are the narratives of the pundits Sarat Chandra Das and Rinsing, describing their respective crossings of the central range—the former into Tibet in 1879, the latter, as alleged, over the Jonsong La in 1884. In yet another Mr. Freshfield discusses the name of the world's highest measured peak, expressing his well-known objection to the name "Mt. Everest," to which he prefers "Gaurisankar," or, better yet, "Chomokankar"—a Tibetan name for this particular summit of the Gaurisankar group. C. E. F.

Elements of Geology, by Joseph Le Conte, revised and partly rewritten by Herman LeRoy Fairchild, Professor of Geology in the University of Rochester. Fifth edition. D. Appleton and Co., 1903.

The appearance of Le Conte's portrait opposite the title-page reminds the reader that the venerable geologist has passed away. Geology is a growing science, and, excellent as the manual was, revision was needed to keep it abreast of present needs. Professor Fairchild has done this work well, but keeping of design, so far as might be, the form and spirit of the original. Even the paging of the sub-topics will usually be found the same—a limitation to the reviser's work which must have been embarrassing at times.

Very many of the illustrations of the earlier editions were antiquated, and a large body of new material has been introduced—a process which might in some cases have profitably been carried further. One is quite willing to see Newberry's curious drawing of the Colorado Cañon, with its deceptions, disappear from the

volume. At page 48 one of Le Conte's favourite graphic illustrations is wisely put aside in favour of a good photograph of a Western glacier, while a fine view of the Mammoth Hot Springs displaces the ugly drawing in the fourth edition.

The very brief treatment of atmospheric agencies is unfortunate, in view of modern emphasis in this field, but is doubtless due to the limits set to revision, as already stated. At many points, however, the text has been modernized; for example, the time occupied in making the Niagara gorge is given with due reference to the doubtful elements in the problem. We find the evolution of drainage discussed, in its stages from youthful to mature, and with reference to adjustment and classification. So, too, we find an adequate notice of such drift-forms as kames, eskers, and drumlins. Calderas replace (p. 98) a fanciful comparison of a volcanic cone with an exogenous tree. The work of revision seems to have been carried on, and was probably needed, more in the dynamic than in the other sections of the book.

In the historical geology we find, as we should expect, the introduction of glacial and interglacial epochs, and a fuller treatment of the glacial Great Lakes, including a notice of post-glacial land-warping in that region. The most radical departure in the volume is in the reviser's apparently full adhesion to the Planetesimal Hypothesis of Chamberlin. The more extended references to this are found in the discussions of the earth's interior (p. 88); of the form of the earth (p. 172); of the pre-geologic eras (p. 295), and of the climates of the coal period and of glacial time (pp. 397 and 616–619).

The volume is vastly improved for present-day uses, although, in justice to the reviser, it should be said that he would doubtless have gone much farther if he had been given entire freedom.

A. P. B.

Physique du Globe et Météorologie, by Alphonse Berget, Docteur ès Sciences. Paris, C. Naud. 1904. 8vo, 365 pp., 128 figs., 14 pls. (*Price, 15 fr.*)

The present volume is a summary of the lectures given by M. Berget in the Physical Geography Laboratory at the Sorbonne during the past four years. There was no intention on the part of the author to write a *treatise*, the book being distinctly designed for purposes of elementary instruction. The class of persons for whom these lectures were prepared, and before whom they were delivered at the Sorbonne, is composed of students of the natural

sciences, of botany and of geology, who seek the larger aspects of terrestrial physics, of physiography, and of meteorology. For this reason the author has minimized the mathematical treatment of his subject, and the few formulæ are given in small type, so that they can readily be omitted.

The first part of the book is taken up with a discussion of the essential facts of astronomy—the form and movements of the earth; gravitation; the density of the earth; the nebular hypothesis; chapters on geodesy and geodetical methods; seismic disturbances and terrestrial magnetism. The second part deals with the physics of the ocean, occupies pages 125 to 162, and contains brief consideration of the density, temperature, and salinity of the ocean water, waves, tides, and currents. The third part, the physics of the atmosphere, occupies over one-half of the whole volume. In this section the author has endeavoured to emphasize the general laws governing the movements of the atmosphere and atmospheric phenomena, and has set himself the task of showing that a knowledge of the laws of terrestrial physics and of physiography makes it possible to deduce the meteorological conditions of a district. His point is that it is better to deduce these conditions, to predict them, than to learn them from tabulated data. This is a rational method of treatment in a book of this sort; but it has been altogether too much neglected, and meteorology has, in consequence, often seemed to lack interest to the general student. More of the large view, and the general law, is needed in our teaching of elementary meteorology.

The discussion of meteorology is necessarily incomplete; but as the author distinctly says that he has tried to write only "an introduction to the study of meteorology," no further comments on this subject are called for. On the whole, this book cannot be said to "fill a long-felt want." We already have, for example, Hann's admirable *Erdkunde* of a few years ago. Nevertheless, the volume will doubtless prove of interest to many persons who are familiar with French, and who want a readable general account of the subjects here discussed. R. DEC. W.

Eastern Uganda. An Ethnological Survey. By C. W. Hobley. Occasional Papers No. 1. The Anthropological Institute of Great Britain and Ireland. London, 1902.

While Mr. C. W. Hobley was Sub-Commissioner in the Uganda Protectorate he made many ethnological notes and collected several vocabularies of the tribes living in Eastern Uganda between the Mau Escarpment and Victoria Nyanza. This valuable material

has been published by the Anthropological Institute, in a large, handsomely-printed pamphlet of 96 pages, with a map and five plates of photographs. The map shows the distribution of the four groups of natives inhabiting this area. Mr. Hobley says that in this, as in most other mountainous regions of Central Africa, there are practically no human habitations at an altitude of over 7,000 feet. The climatic conditions above that altitude prevent the growing of dhurra and the eleusine grain (wimbi), and this fact, he thinks, is sufficient to check the occupancy of higher latitudes as places of human abode.

Bibliotheca Geographica. Vol. VIII, 1899. Compiled by Otto Baschin for the Berlin Geographical Society. 511 pp. W. H. Kuhl, Berlin, 1902.

The eighth volume of this most complete of geographical bibliographies contains 33 more pages than the last preceding number. In fact, the work has been slowly and steadily growing in thickness ever since the volume appeared. The geographical literature of the Russian Empire, Austria-Hungary, and the Balkan States is more completely indicated in this volume than in its predecessors, and the Society has adopted for the transliteration of Russian words and names the scheme now in use at the Royal Library and the University in Berlin A few items, as Tyrrell's "The Geology of the Klondyke Region," under the subdivision "Alaska und Aleuten," might more properly have been placed under "Britisch Nord-Amerika."

The Grand Duchy of Finland. By the Author of "A Visit to the Russians in Central Asia." T. Fisher Unwin, London, 1903. (Price, 2s. 6d. net.)

This short book is little more than a catalogue of the rulers who for many generations have lorded it over Finland. Incidental remarks are interlarded, but the whole is only a slight sketch that throws little light on the characteristics, the development, or the wrongs of the Finns.

A List of Books, Magazine Articles, and Maps relating to Central America. Compiled for the Bureau of the American Republics by P. Lee Phillips. Government Printing Office, Washington, 1902.

The latest bibliographical work of Mr. P. Lee Phillips, in charge of the maps and charts in the Congressional Library, is a list covering 109 pp. of the literature and maps relating to Central America and the countries composing it. The list is the fullest compilation of the sort yet made.

M. FROIDEVAUX'S PARIS LETTER.

PARIS, January 20, 1904.

Among the recent addresses before the Société de Géographie, attention may be called to that of M. Lucien Briet, adjunct-secretary of the Speleological Society, on a portion of the Upper Pyrenees, as yet little known to tourists and even to scientific men, the white marble peak of the Munia, which rests upon an enormous mass of granite and is crowned with slate. This superb mountain, 10,300 feet high, lies across the frontier and flanks on the east the great mass of Mont-Perdu, which dominates the amphitheatre of Troumouse, the most imposing of all those carved in the marble of the Pyrenees.

M. de Martonne, professor of geography in the University of Rennes, treated the subject of the southern Carpathians, the character and the relief of the country, and the curious pastoral life of the population, so singularly adapted to its environment.

A naturalist, M. Eichard, described his journeys of exploration on the coast of Mozambique in search of the pearl-oyster beds; and Dr. Noel Bernard made an interesting report of his studies on the curious plateau of Boloven, in Annam, a territory of nearly 4,000 square miles, composed of a series of terraces separated by valleys varying in depth from 800 to 4,000 feet. The population numbers about 20,000, the largest group being that of the Bolovens, warlike savages, almost always fighting among themselves. There seems to be no great future for this region, which is certainly less desirable than Tranninh as a site for *sanatoria*.

The Société de Géographie Commerciale recently celebrated the thirtieth anniversary of its foundation—a date which completed also the twenty-fifth year in office of its active Secretary, M. Gauthiot.

A committee has been formed to compile a methodical inventory of the resources of French West Africa. This committee is now engaged, under the direction of the Colonial Administration, in classifying all the unpublished manuscript documents at the various posts of the Colony, and intends to prosecute by means of technical commissions the investigations which call for special knowledge.

The publications of this new Committee will possess at once a scientific and a practical interest; a publication exclusively scientific is the Atlas of Volcanoes, projected under the direction of

M. Elisée Reclus by the Belgian Society of Astronomy, Meteorology, and Physics of the Globe.

Nearly all the explorations to be noted are in Africa. In Morocco, M. Gaston Buchet has discovered Berber ruins. In the Sahara, Lieut. Besset and Capt. Pein, in command of two separate expeditions against the Hoggar, have fixed important points on their routes and added to our geographical knowledge. In Western Africa, Lieut. Dyé is working on the hydrography of the river Senegal; and in Dahomey, Lieut. Drot has brought back from three years of travel a treasure of maps and of sketches not less important than those collected by M. d'Huart, Commander of the Chad flotilla, from his explorations among the islands of the lake.

The search for a water communication between the Benue and Lake Chad by way of the Tuburi swamp and the Logone may be regarded as successful since the voyage of Capt. Lenfant. It seems to be proved that the Tuburi is navigable every year for a period of three months.

There is no new information concerning the Chevalier Mission; but M. Alfred Fourneau accomplished in July last a tour to Kanem and returned by water, passing through the archipelago and observing its continuous and rapid extension towards the west.

In America the Créqui-Montfort and Sénéchal de la Grange Mission has done good scientific work in the study of the region comprised between Antofagasta, Jujuy, and Tarifa and the Peruvian frontier, completing the explorations of Col. Pando in certain parts of Bolivia. The detailed report will set before us the geographical results attained in the Lake Poopo region, M. Courty's geological investigations, and the studies in ethnography and archæology.

Dr. Charcot's plan of exploration in the Antarctic, as arranged with Dr. Nordenskjöld, is as follows: His ship, *Le Français*, will steer for the South Shetlands and that part of Graham Land southwest of the region explored by the *Belgica*. The ship once anchored in a safe harbour, Dr. Charcot will undertake sledge journeys, either towards the scene of Dr. Nordenskjöld's explorations or to the wholly unknown Alexander I. Land. This will occupy the summer of 1904–1905, and the ship will return to the civilized world in April, 1905.

There is not much to be said of new publications, rarely less numerous than at this time, though we find in the tenth volume of the *Nouvelles Archives des Missions Scientifiques et Littéraires* such reports as those of M. Gaston Buchet on Northern Morocco, M. Mathuisieulx on Tripoli, Count de Barthélemy on Annam and Laos, M.

Menant's study of the Parsis in British India, and M. Eugène Poisson's report on rubber-trees and other Colonial plants in Brazil, in the West Indies, and in Costa Rica. Mention must be made, notwithstanding its archæological character, of a study by M. S. Gsell, entitled: "Administrative Inquiry concerning Ancient Hydraulic Works in Algeria," a book of unquestionable value for the knowledge of the climate and the hydrography, not less than for the history, of the country.

The Commission Française des Glaciers has published its second annual report in the 29th volume of the *Annuaire* of the Club Alpin Français. In this report M. Paul Girardin relates his observations in the summer of 1902, in Haute-Maurienne, in the Grandes Rousses and in the Oisans (Savoy and Dauphiny). The conclusions reached are:

1st. That in all the glaciers of this region the movement of retreat, after having been very rapid, seems in later years to have slackened, and even to have ceased altogether;

2d. That in consequence of this movement of retreat, which began towards 1860, nearly all these glaciers have been brought to a similar topographical situation and reduced to the state of plateau glaciers, ending at the upper edge of freshly-abandoned escarpments;

3d. That in these glaciers the retreat manifests itself, at present, by a movement of transfer of the front from left to right, that is to say—the glaciers being turned to the west—a movement from the side towards the sun to the side towards the shade.

Following this report is M. Ch. Rabot's Review of Glaciology for 1902, perhaps even more valuable than that for the previous year, but lacking, unfortunately, the index, which would add to its usefulness.

The Commission des Glaciers has published also the observations made by the Forest Administration in Haute-Savoie and Savoie on the snowfall and avalanches during the winters of 1899–1900, 1900–1901, and 1901–1902.

In a recent number of *La Géographie*, M. Emile Chaix-Du Bois has a note on a phenomenon of erosion by running water observed by him near the confluence of the Valserine with the Rhone.

Though not geographical, the work of MM. William and George Marçais on the Arab Monuments of Tlemcen presents a real ethnographical interest. Articles of value to the geographer and the geologist will be found in the *Bulletin* of the Comité de l'Afrique Française.

Of publications upon Asia there is but one of importance, the volume of the Pavie Mission devoted to the researches on the Natural History of Eastern Indo-China. With this admirably-illustrated work and the atlas recently distributed the series of the Pavie Mission approaches completion.

I must not omit to mention the three books lately published by Mme. Coudreau, describing her journeys to the River Curua, to the Mapuera, and the Maycuru, each with its illustrative maps, and continuing in this way with rare ability the work so well begun with her husband.

HENRI FROIDEVAUX.

TRANSACTIONS OF THE SOCIETY.

FEBRUARY, 1904.

A Regular Meeting of the Society was held at Mendelssohn Hall, No. 119 West Fortieth Street, on Tuesday, February 23, 1904, at 8.30 o'clock P.M.

Vice-President Moore in the chair.

The following persons, recommended by the Council, were elected Fellows:

Mary Judson Averett. Stephen Avery. George A. Archer.

The Chairman then introduced the speaker of the evening, the Rev. Putnam Cady, who addressed the Society on The Physical and Historical Geography of the Dead Sea Region.

Maps and views were shown on the screen.

On motion, the Society adjourned.

NOTES AND NEWS.

THE NEXT MEETING of the Society will be held at Mendelssohn Hall, No. 119 West Fortieth Street, on Tuesday, March 15, 1904, at 8.30 o'clock P.M.

Mr. William Morris Davis, of Harvard University, will address the Society on his Journey in Turkestan.

EIGHTH INTERNATIONAL GEOGRAPHIC CONGRESS.—Fellows of the Society are reminded that to acquire membership in the Congress

they must apply, with a remittance of Five Dollars, to The Committee of Arrangements Eighth International Geographic Congress,

HUBBARD MEMORIAL HALL,
WASHINGTON, D. C.

The American Geographical Society has invited the Congress to hold sessions in New York under the auspices of this Society on September 13, 14, and 15, and the Committee of Arrangements has accepted the invitation.

This Society is, therefore, actively engaged in arranging for these New York meetings.

The Society has decided to provide for transportation from Washington to New York and hotel accommodation in New York for all the foreign delegates who may be in attendance on the Congress.

The authorities of the American Museum of Natural History have generously offered to this Society for the convenience of the Congress the use of several of their commodious rooms for lectures, and also rooms for the press, for conversation, smoking, etc., etc. They also offer to open all departments of the Museum for inspection by the Congress on the 13th of September, and to entertain the members on that day at luncheon.

The Director of the New York Public Library has kindly consented to arrange an exhibition of the interesting and valuable geographical material in the Lenox Library, and has cordially invited this Society and its guests, during the session of the Congress, to examine the Lenox collections.

The American Geographical Society hopes to arrange a steamboat excursion on the 15th of September to Fishkill-on-the-Hudson, where, on the hill behind the town, Mr. William M. Davis, of Harvard University, will explain to the Society and its guests the problem of the peneplain, particularly well marked at this point.

On the return from Fishkill it is hoped that opportunity will serve for a stop at West Point to take advantage of the courteous invitation extended by Col. Mills, Superintendent of the Military Academy, to inspect the workings of that famous institution.

SEÑOR FERNÁNDEZ DURO, President of the Royal Geographical Society of Madrid, notes, in the *Boletín* for Oct.–Dec., 1903, the erection of a monument at Nootka, last August, with the following inscription:

VANCOUVER AND QUADRA
MET HERE IN AUGUST 1792
UNDER THE TREATY BETWEEN
SPAIN AND GREAT BRITAIN
OF OCTOBER 1790.

ERECTED BY THE
WASHINGTON UNIVERSITY
STATE HISTORICAL SOCIETY
AUGUST 1903.

Vancouver's is now the more familiar of the two names here recorded, but until about the year 1860 *Quadra and Vancouver's Island* kept its recognized place on the maps of North America published in the United States. As the association seems to imply, the relations of the two explorers were altogether friendly. The story is told in H. H. Bancroft's *Northwest Coast* (History of the Pacific States, Vols. XXII–XXIII), though the author takes the unwarrantable liberty of writing Quadra's name *Cuadra*. Reform so applied, if admitted, would multiply without end the million confusions of history.

The full name of the Spanish captain was Juan Francisco de la Bodega y Quadra, and Bodega Bay, California, is another monument to his memory.

AN UNKNOWN ANIMAL.—The *Bulletin* of the Bordeaux Commercial Geographical Society, for the 7th of March, publishes a letter written at Njolé, in the French Congo, on the 12th of January, by Father Trilles. This letter tells of an amphibious animal reported to exist in various parts of the country, very ferocious, larger than a hippopotamus, and variously known to the natives as the *river elephant*, the *water tiger*, the *river tiger*, etc.

Father Trilles had been on the track of the monster for three years. Twice the animal had been found asleep on the sand and the Father had been called to see him, but too late.

At another time a sergeant of tirailleurs had wounded one of these beasts, but it managed to make its escape. Two had been killed elsewhere, but the hungry natives had eaten them like the missionary on the plain of Timbuctoo.

Father Trilles gives this description of the creature: His coat is of a tawny grey with black spots, the hair coarse, the tail is long and strong, the paws are short and broad and armed with very sharp claws, two and a half or three inches in length, like those of a tiger.

The animal lurks near the waterfalls and preys upon the women and children and goats. It even attacks the crocodile; evidently an indiscriminate beast.

Not the least remarkable thing in the Father's letter is the familiarity of the Congo natives with the tiger, an animal not found in Africa.

THE SAINT PETERSBURG ACADEMY OF SCIENCES has offered a reward for information concerning Baron Toll, of whom nothing has been heard since he started for Bennett Island in the New Siberian group, in 1902.

THE METRIC SYSTEM IN THE BRITISH EMPIRE.—A Parliamentary paper summarizes the replies from Colonial Governors to the circular sent from the Colonial Office, in 1902, with regard to the adoption of the metric system.

The system is already in use in Mauritius and the Seychelles.

The adoption is favoured by Australia, New Zealand, the Cape of Good Hope, Transvaal, Orange River, Southern Rhodesia, Gambia, Northern Nigeria, British Guiana, Trinidad, the Leeward and Windward Islands (except Barbados).

Sierra Leone, Southern Nigeria, Ceylon, and the Falkland Islands favour the system, but wait for its adoption in the United Kingdom or in the Empire.

Hong Kong would act in common with other Colonies.

New South Wales, Victoria, and Western Australia are favourable, but hold, with South Australia and Tasmania, that the matter is one for the Commonwealth.

Fiji and British New Guinea would go with Australia.

Jamaica and British Honduras wait for the adoption of the system in the United States.

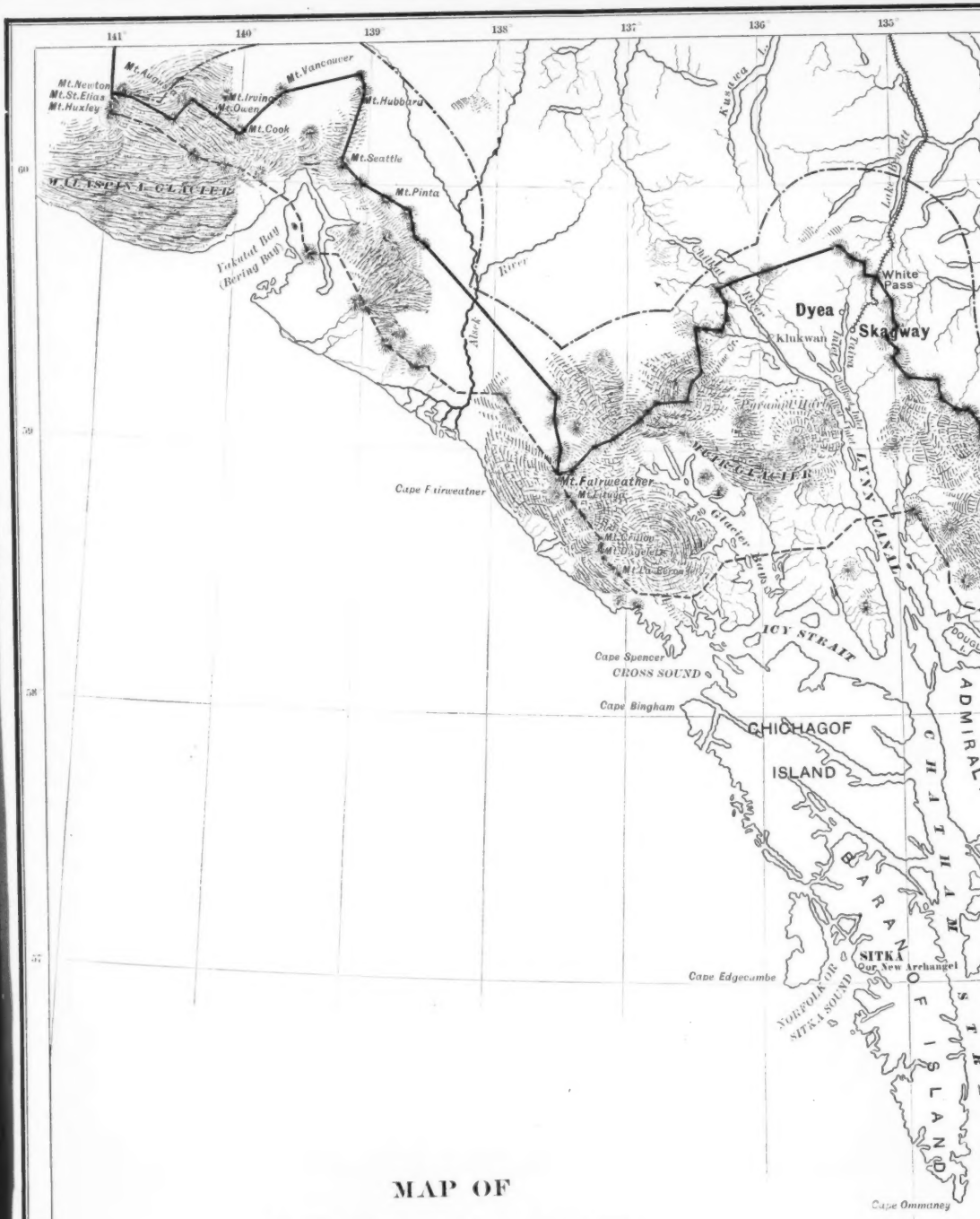
The Straits Settlements and Labuan would follow India, of which nothing is said.

St. Helena, Cyprus, Lagos, Wei-hai-wei, Barbados, and the Bahamas do not approve.

The Gold Coast and Queensland would accept the system, expecting inconvenience.

Natal waits until the British Government has agreed upon some legislation.

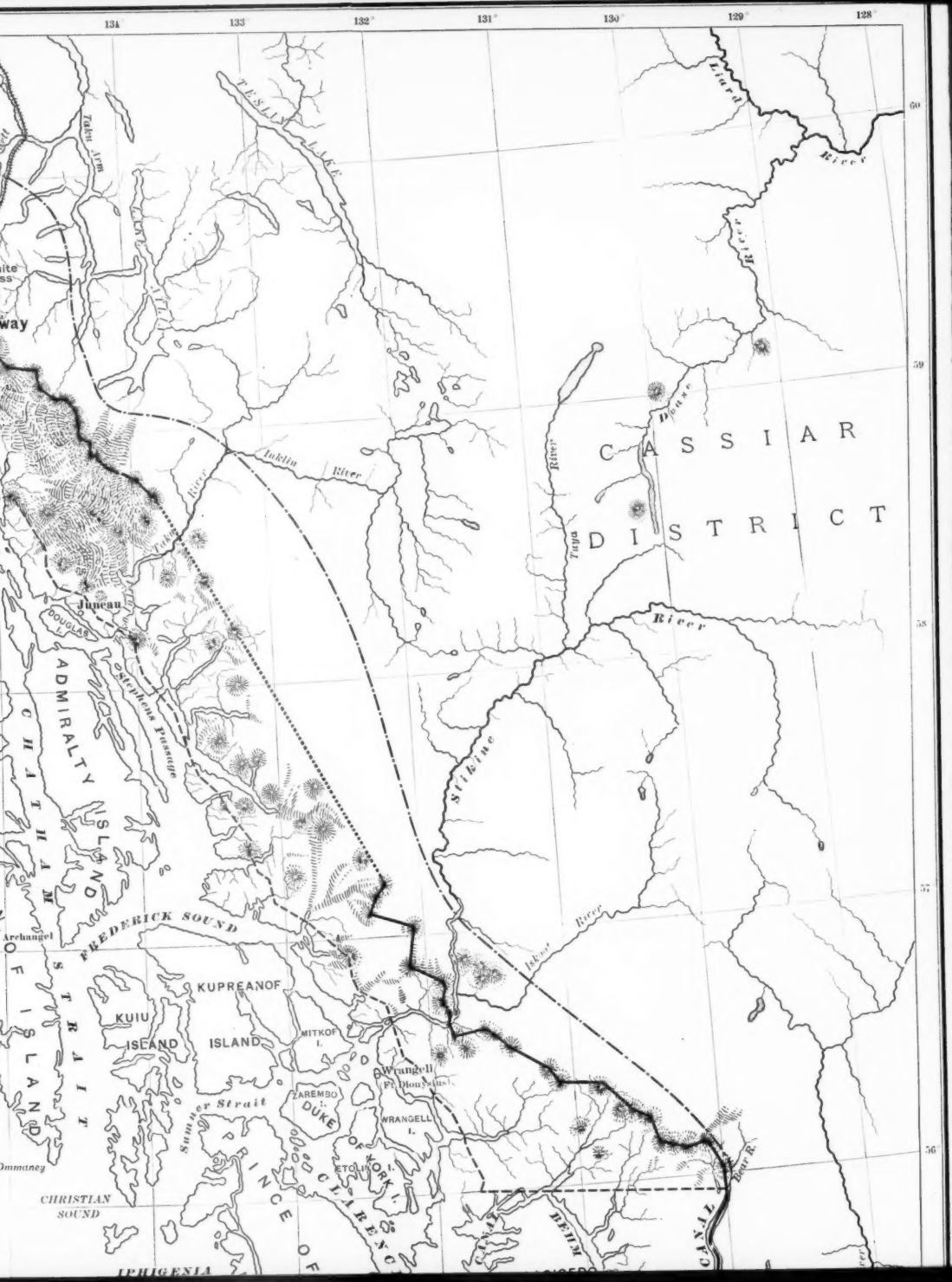
Newfoundland, Malta, and Bermuda have not definitely pronounced, and Canada has made no reply.



MAP OF

SOUTHEAST ALASKA

Showing the Boundary fixed by the Award of the Alaskan


134°
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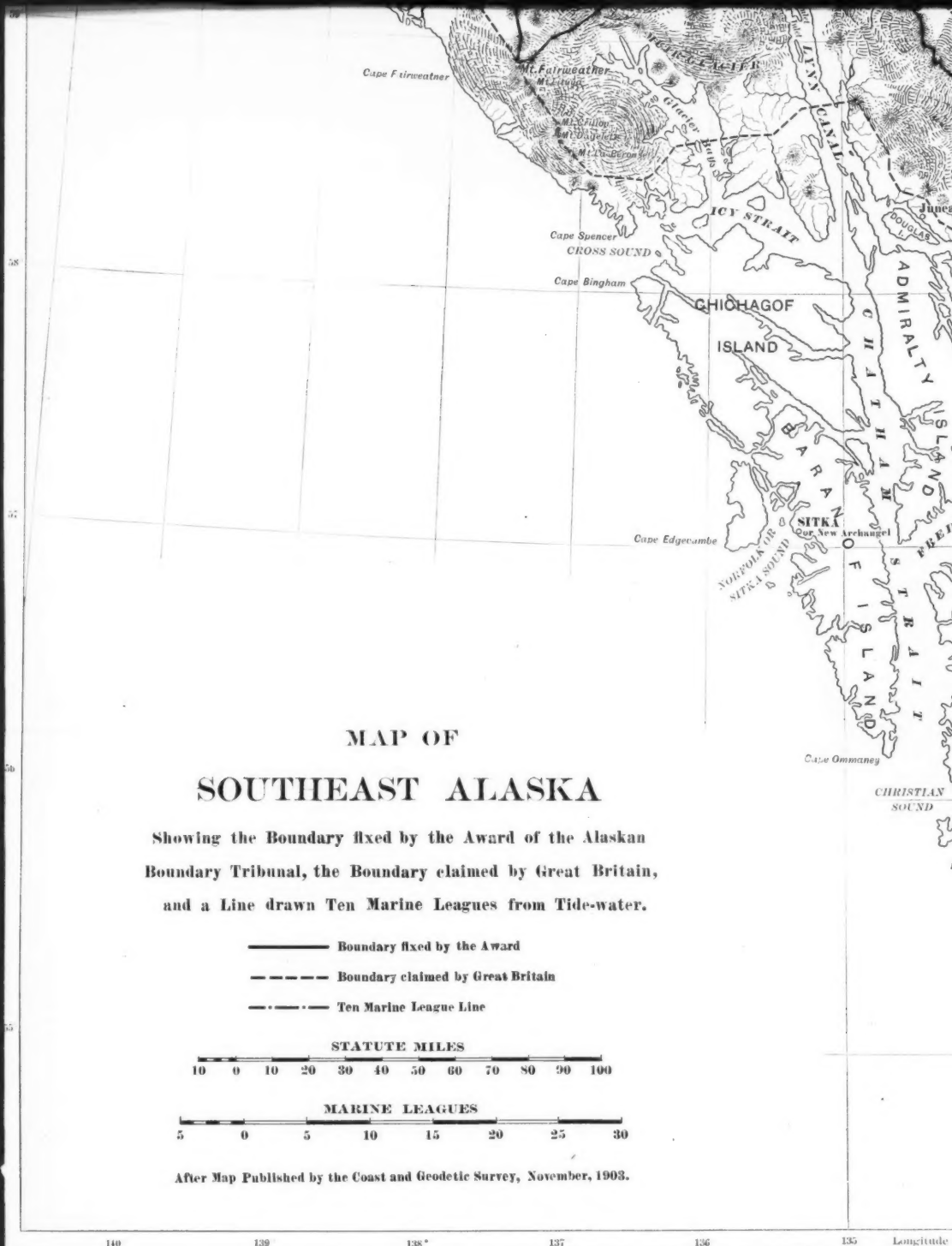
60
59
58
57
56
TESLIN LAKE
Taku Arm
Taku River
Juneau
DOUGLAS
Stephens Passage
ADMIRALTY ISLAND
CHATHAM STRAIT
OF ISLAND
Archangel
FREDERICK SOUND
KUPREANOF ISLAND
KUIU ISLAND
MITKOF I.
Wrangell
Ft. Dionysius
ZAREMBO I.
DUKE OF YORK I.
WRANGELL I.
ETOLIN I.
Summer Strait
CHRISTIAN SOUND
PRINCE OF
IPHIGENIA
Ommaney
Liard River
Dease River
Dease Lake
Jaklin River
Tuya River
CASSIAR DISTRICT
Stikine River
Iskut River
Bear R.
CANAL
BEHM



MAP OF

SOUTHEAST ALASKA

Showing the Boundary fixed by the Award of the Alaskan Boundary Tribunal, the Boundary claimed by Great Britain, and a Line drawn Ten Marine Leagues from Tide-water.

——— Boundary fixed by the Award

– – – – – Boundary claimed by Great Britain

—·—·— Ten Marine League Line

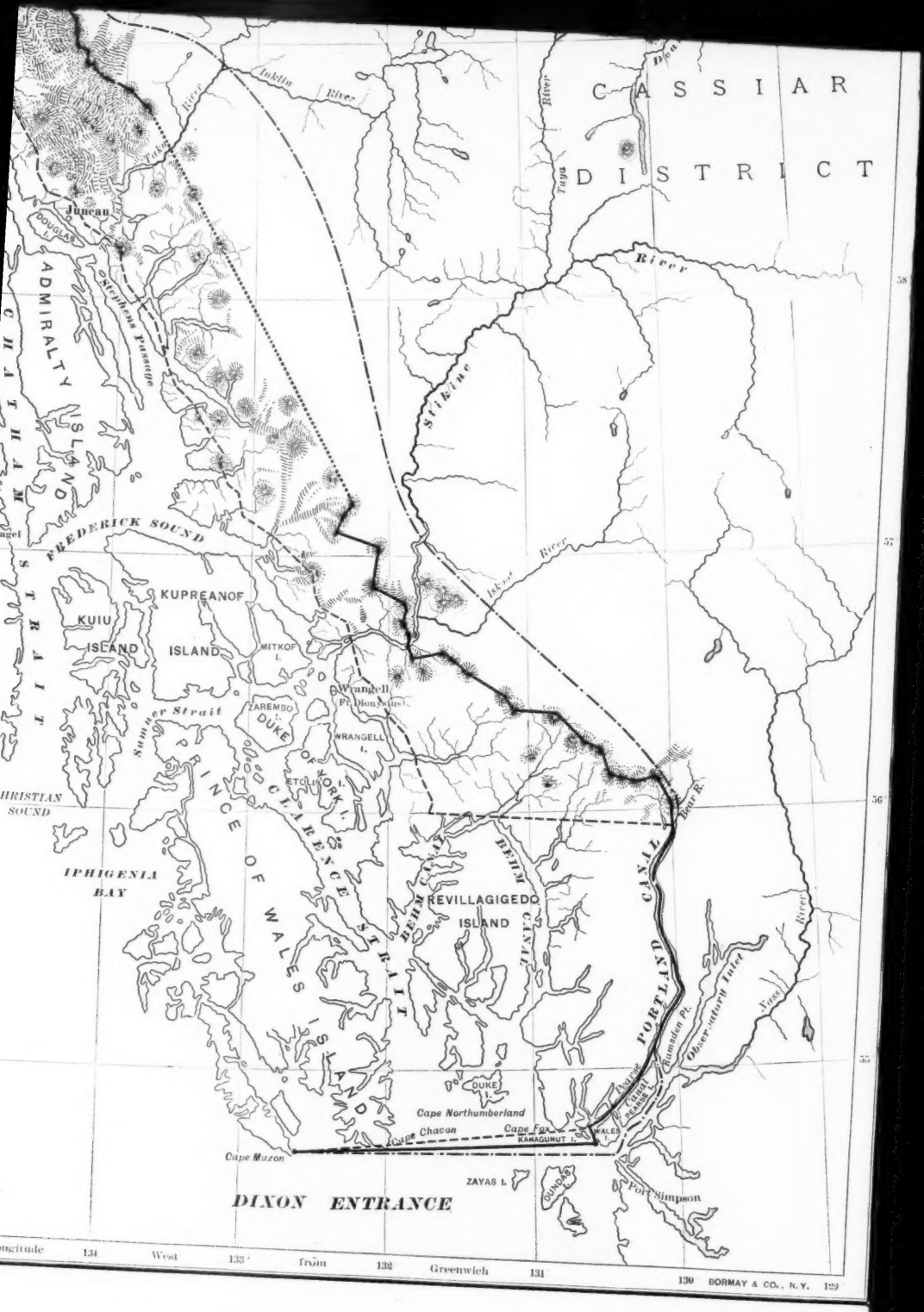
STATUTE MILES

10 0 10 20 30 40 50 60 70 80 90 100

MARINE LEAGUES

5 0 5 10 15 20 25 30

After Map Published by the Coast and Geodetic Survey, November, 1903.


CASSIAR
DISTRICT
Juneau
Douglas I.
Taku River
Inklin River
Taya River
Stikine River
Iskut River
Stephens Passage
ADMIRALTY ISLAND
CHICHAGOF
FREDERICK SOUND
KUIU ISLAND
KUPREANOF ISLAND
MITKOF I.
Wrangell
Ft. Dionysius
ZAREMBO
WRANGELL I.
Sumner Strait
DUKE OF YORK I.
ETOLIN I.
CHRISTIAN SOUND
IPHIGENIA BAY
PRINCE OF WALES ISLAND
CLARENCE STRAIT
BEHM CANAL
REVILLAGIGEDO ISLAND
PORTLAND CANAL
Bear R.
Ross River
Observatory Inlet
Ramsden Pt.
Pearse Canal
DUKE I.
Cape Northumberland
Cape Chacon
Cape Fox
WALES I.
KANAGUNUT I.
Cape Muzon
ZAYAS I.
DUNDAS I.
Port Simpson
DIXON ENTRANCE
58
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Longitude 134 West 133 from 132 Greenwich 131 130
BORMAY & CO., N.Y. 129